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Editorial Notes

Flueless Heating

It will be recalled that in January last the Advisory Committee appointed by the President of the Royal College of Physicians to consider the significance to health and comfort of the use of flueless gas appliances in rooms unprovided with flues issued its final report, in which were considered in detail fundamental problems and commonly accepted data in regard to ventilation, warmth, comfort, and the effects, if any, upon health of the products of combustion of town gas. The findings of the Committee were published in the "JOURNAL" for Jan. 30, and they proved that, with correct gas rate, flueless gas heaters can be employed with absolute safety and with no ill-effects on health in rooms not provided with a flue. The report is, of course, an extremely valuable one and carries the stamp of the highest authority.

Shortly after the issue of this report, which followed an interim report in 1935 in which it was stated that "any risk to health from the inhalation of products of combustion from flueless gas heaters is discounted by the fact that, even with an air charge as low as one per hour, discomfort from overheating would be experienced long before harmful concentrations of such products would be reached," Mr. A. H. Barker, the Consulting Heating Engineer, delivered a Chadwick Lecture on the relative advantages of heating by coke, gas, and electricity. The Chadwick Trust has now published the Lecture in booklet form available at the price of one shilling. In this Lecture, as in the Paper he presented to the Institution of Civil Engineers a year previously, he referred to the deleterious effects of the products of gaseous combustion. "With gas," he stated, "the only way in which 100% of the heat in the gas can be delivered into the room is to burn the gas in naked flames in the room itself, allowing all the products of combustion to mix with the breathing air, a process which is wholly undesirable from the point of view of practical hygiene. . . . I would never myself consent to occupy a room continuously in which the normal method of heating allowed these vitiated products of combustion to be mixed with the breathing air." The suggestion that the proper use of flueless gas appliances is deleterious to health is wholly unwarranted. At the time of his Paper to the Institution of Civil Engineers we called Mr. Barker's attention to the interim report of the Advisory Committee to which we have referred, but he apparently thinks that a body of highly eminent medical men who have examined the matter exhaustively and have arrived at such definite conclusions are wrong and that it is his mission to refute their findings in a public lecture.

Mr. Barker in his Chadwick Lecture went on to say categorically that electricity alone can do local heating satisfactorily and in such a case is enormously cheaper than any other heating agent. "Gas," he averred, "can only be used in a way which is really practicable in the form of a gas fire. Even with a chimney a gas fire is found by many people to produce a sleepy effect, probably in consequence of the invisible escape of products of combustion into the room." There is no foundation in fact for such statements. Localized heating by gas can be carried out perfectly satisfactorily. The popularity of portable radiant flueless heaters is evidence of this. It is obvious that in this as in many other respects Mr. Barker has not kept himself in touch with recent developments in gas heating or the trend of public demand. As, for example, his statement that the turning off of the gas fire and its subsequent relighting with a match on the return of the occupant is so cumbersome and troublesome that very few occupants would take the trouble. Surely Mr. Barker must know that gas fires are now self-lighting. It is unfortunate, however, that an eminent Heating Engineer should, in a public lecture, draw such an unfair comparison between gas and electricity for heating.

Gas Fires and Comfort

The fact that Institution Meeting subjects are still under discussion wherever one goes is proof enough that this year's proceedings were among the livest of recent times. We have already referred to the pleasure which was universally felt at the appearance in one of the Discussions of Mr. H. James Yates, and at the compliment to the Institution and the author of the Paper which his contribution signified.

Perhaps the chief interest in Mr. Yates' remarks—due in some measure to the air of mystery in which he left the subject—was his reference to the future of gas fire design, and his definite prophecy that the radiant, as we know it,

will go. An interesting reaction to this was the article which we published last week by Mr. E. V. Evans, in which, with direct reference to Mr. Yates' Institution prophecy, he described in detail the outcome—covered by Patent No. 462,055 of Sept. 13, 1935—of certain recent research in the laboratories of the South Metropolitan Gas Company. The theory upon which they worked of the supposed greater comfort derived from a solid fuel fire was clearly set out, and the performance figures given for the new fire were convincing. It is safe to assume that Mr. Evans would not have given us the information for publication unless he was satisfied that a practical proposition has been evolved along the given lines. We have not yet had an opportunity of seeing the new fire, but from the photograph of it in its simplest form it still has the appearance, and especially the "formality," which we usually associate with the "radiant as we know it," though of course actually the front screen serves a somewhat different purpose. As regards the variant which Mr. Evans described, it is interesting to learn that it so closely resembles the coal fire beloved by the Englishman that it is in constant danger of being stirred by his boot. We have in mind certain electrical travesties which always tempt our boot to much rougher usage than that.

The South Metropolitan communication has still further aroused our curiosity as to what Mr. Yates has in store for us in the future. At the same time we know enough of the thoroughness of Mr. Yates' methods to realize that nothing will bring us to that future except his entire satisfaction with any new departure which his research laboratories may evolve. Guessing may be a profitless occupation, but we confess that our curiosity has driven us to a search among some of the Radiation patents which have not yet apparently come to full fruition. Particularly are we interested in Nos. 329,355 of Nov. 17, 1928, and 389,847 of June 26, 1931. The outcome of the latter patent was, we believe, the fire which Mr. Yates introduced to the Gas Industry a year or two ago under the name "Cobble Beam." So impressive was the appearance of this gas fire when it was first demonstrated, and in so pleasant a manner did it seem to satisfy the condition of abolishing the "radiant as we know it," that we venture to hope that further research may have perfected it, and that something very similar to the original "Cobble Beam" may be the subject of Mr. Yates' prophecy at the Institution Meeting.

Finality not Yet

A FEW points may be mentioned from our study of the patent specifications in question, affording an interesting comparison of the not dissimilar lines upon which two such eminent sets of investigators have been working. For instance, Radiation described an improved kind of gas fire capable of emitting short infra red energy of a type which their investigations had indicated to be desirable for the attainment of comfort. The aim was the elimination of columnar radiants and the simulation of the appearance of a brightly glowing coal or coke fire. The use of luminous gas flames was proposed which would presumably preclude the suspension of refractory material in the flames. The specification also refers to the provision of high temperatures within the body of the fire and the use of a deep refractory front with interstices through which the combustion chamber is visible—this single combustion chamber, by the way, extending over the whole width of the fire. The firebrick back of the combustion chamber is described as of refractory material capable of withstanding high temperatures at the front face and yet of low thermal conductivity to minimize the rearward flow of heat from the front face.

We shall be intrigued to see whether, in addition to affording a comparison with the work of the South Metropolitan Gas Company, these few notes eventually prove to be a clue, however slight, to the lines along which Mr. Yates was thinking at the Institution Meeting. At any rate, we welcome it as of excellent omen to the Industry that not only gas fire design, but the very principles of gas radiant heating, continue to be a perpetual subject of research and investigation. We doubt not that others, too, are working at the problem in their own particular way, and that effort generally will be stimulated by the limelight which has been turned upon the subject in recent weeks by Mr. Yates and by Mr. Evans. The importance of the space heating load is such that we cannot yet contemplate regarding the gas fire of any day as the last word.

A Lost Opportunity

THERE was published last week by the *Daily Telegraph* a comprehensive supplement dealing with smoke abatement and the contribution thereto of modern fuels and furnaces. It is well now and again to re-awaken public conscience in this way to an evil which blackens our atmosphere, begrimes and corrodes our buildings, and causes devitalization, depression, and much actual illness to the town dweller. Nine million tons of smoke are discharged into the air of Great Britain every year from domestic and industrial chimneys—and much of it quite needlessly in view of the many modern methods of combating the nuisance.

There is no need to reiterate here facts or figures concerning the annual depredations of smoke, but it cannot be emphasized too often that the outstanding guilt of smoke pollution is the harm it causes to the human system by restricting the natural boon of fresh air and sunshine. The tonic effect of both these on health—and through health on working efficiency—is a matter of common knowledge, and this country has not so liberal an endowment of sunshine that it can afford to lose any of it by impenetrable layers of irritant particles enshrouding the lower atmosphere. Still less can a young generation that is being counselled towards habits and ideals of fitness afford the deprivation.

While congratulating the *Daily Telegraph*, therefore, on the production of a supplement which should do much to arouse the public in general from its regrettable apathy in this matter, we are, to say the least, a little surprised in this particular instance to find such scant acknowledgment of one of the principal contributors towards smoke abatement—namely, the Gas Industry. Apart from a few very general references to the products of carbonization, the reader of this supplement would seem to be allowed to run away with the idea that a pure atmosphere is wholly or very largely attainable through the use of anthracite or other smokeless coals or by improved combustion and the extraction of the noxious contents of the waste products before emission from the chimney. This is perfectly true—up to a point; but can it be regarded as the whole story? Perhaps we are biassed; but it seems that a valuable opportunity was lost of paying tribute to the services of an Industry which has played a greater part probably than any other—and certainly over a longer period—in combating the smoke evil throughout the towns and cities of this country. Moreover, it is not unusual for the Gas Industry to take adver-

tising space in publications of this description. Did the powers that be consider it not worth while to insert even a brief announcement in support of " Gas—the Smokeless Fuel " in this particularly appropriate publication—or were they not given the opportunity?

If Sentiment Ruled

SENTIMENTAL reasons, according to a statement by a grandson, prompted the willing to the Directors of the Berkeley Gas Company of his gas stove and meter by Mr. Henry Moffatt, of Wotton Without, Gloucestershire. We have not been told anything about the condition or age of these essential appliances, but as the testator died when he was 92 years old, and as his father founded the Company more than 80 years ago, it appears as though they may have seen considerable service. Doubtless Mr. Henry Moffatt was deeply attached to the Gas Company, of which he had been Managing Director for many years, and this disposal of part of his property was a kindly gesture, but following the train of thought suggested by such a bequeathal gives rise to just a slight feeling of disquietude.

For instance, would a large gas undertaking welcome, or would it be likely to be embarrassed by, a large number of gas appliances being left to it by consumers who (say) happened to die round about the same date? In changing times like these, would the undertaking also be guided by sentiment in the final disposal of such gifts, thus, perhaps, permitting itself to be gradually overwhelmed, or would heed be paid to the appeal of the authorities for any scrap material that might be of assistance to them in the completion of the country's re-armament programme? The latter course would certainly be preferable to following the example which it was understood was being set by our American friends at the time of the Institution visit to the World's Fair at Chicago in 1934, with their old motor-cars—that is to say, dumping them by the boat load well out in Lake Michigan—but even so the situation might produce its own complications. Anyway, a too close linking-up of sentiment with business would not be an unmixed blessing, and while congratulating the Directors of the Berkeley Gas Company upon having been the recipients of this expression of kindly feeling, we cannot but think that the universal adoption of a similar course would be likely to bring in its train inconveniences of its own.

The Better Way

THE campaign just launched, which aims at directing the supply of iron and steel scrap into its logical channels for the country's present enormous steel requirements, would seem to recommend itself as the better course both for the sentimentally-minded legator and for gas undertakings themselves. Although from the point of view of the Gas Industry scrap is primarily a matter of £ s. d., this campaign—which is sponsored by the British Iron and Steel Corporation—is also in the national interest. Agreement has recently been reached with the National Federation of Scrap Iron and Steel Merchants whereby the export of British scrap to foreign countries will cease and all suitable steel-making material will be purchased by the steel makers at prices that have been stabilized. It was illogical that this country should continue to export scrap on the one hand, while on the other we bought it abroad at scarcity prices.

The idea of stimulating the public, as well as the many industries whose activities lead to the accumulation of scrap metal, forms a natural sequel to this marketing arrangement. In our own Industry worn out plant and old apparatus constantly collect in the works yards—where they are an eyesore in addition to occupying valuable space. The slogan—" Black Cookers Must Go "—provides a case in point, and many undertakings must have considerable stocks of these " old-timers," as well as other ancient appliances, awaiting their final writing off. Such a campaign as this, therefore, furnishes gas executives with both a salve for their consciences which may have hitherto militated against wholesale scrapping, and a ready and proper means towards that end.

In addition, therefore, to disposing of their old bicycles and lawn mowers, gas managers will, from patriotic as well as other motives, consider very seriously this means of getting rid of their stocks of " superannuated " plant and appliances with a view to keeping in regular circulation a raw material which contributes to steel manufacture in the proportion of over 50% of ingot output. There is no question of an emergency; it is rather a matter of avoiding in the future the wastage of a valuable commodity. The habit of sorting out old metal more often and more systematically than is at present the case in a number of works would take us some way towards greater self-sufficiency and would economize our iron-ore and coal resources. In an industry upon which the Nation's prosperity relies to a far-reaching extent, dependence on foreign raw material represents a problem to which, in the case of scrap, a part solution at least is to be found in every yard and workshop.

Forthcoming Engagements

July.

15.—I.G.E.—Gasholder Committee, 2.30 p.m.
19.—LONDON AND COUNTIES COKE ASSOCIATION.—Executive Committee, 11.15 a.m.; Central Committee, 2.30 p.m.
20.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.
21.—I.G.E.—Gas Examination Results Published.
23.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
28.—I.G.E.—Pipes Committee, 2.30 p.m.

Aug.

10.—IRISH ASSOCIATION.—Annual Meeting at Belfast.

Sept.

9-10.—NORTH BRITISH ASSOCIATION.—Annual Meeting at Edinburgh.
15.—I.G.E.—Finance Committee, 10 a.m.; Membership Committee, 11 a.m.; Research Executive Committee, 2.30 p.m.
16.—WALES AND MONMOUTHSHIRE ASSOCIATION.—General Meeting at Porthcawl.
16.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Refractory Materials Joint Committee, 2.30 p.m.
17.—I.G.E.—Joint Lighting Committee, 2.30 p.m.

Oct.

1.—I.G.E.—Liquor Effluents and Ammonia Committee, 11.15 a.m.; Joint Research Committee, 2.30 p.m.
5.—I.G.E.—Research Executive Committee, 2.30 p.m.
12.—I.G.E.—Board of Examiners, 10.30 p.m.
13.—I.G.E.—Finance Committee, 9.30 a.m.; Membership Committee, 10 a.m.; General Purposes Committee, 11 a.m.; Benevolent Fund Committee of Management, 12.30 p.m.; Council, 2.30 p.m.
19.—I.G.E.—Gas Education Executive Committee, 11 a.m.; Gas Education Committee, 2.30 p.m.

Nov.

2.—I.G.E.—Council, 9.30 a.m.; Council (*continued*), 4.30 p.m.
2 and 3.—I.G.E.—Autumn Research Meeting.
3.—BRITISH GAS FEDERATION.—Annual General Meeting and Dinner, Grosvenor House, Park Lane, W. 1.

News in Brief

The Index to the "JOURNAL" for the second quarter of the present year appears as a supplement to this issue.

Owing to Coal Price Increases the Maybole Gas Light Company have decided to increase the price of gas to all consumers by 5d. per 1,000 cu.ft. as from the present survey.

Applications Are Invited for the appointment of Engineer and Manager to the Loughborough Gas Department at a commencing salary of £700 per annum. Further particulars of the position are to be found in our advertisement columns.

The Price of Gas in Galashiels has been increased by 3d. per 1,000 cu.ft., owing to increases in the price of coal, which has risen by £1,336 for the same tonnage as compared with two years ago. During the past year the amount of gas consumed has shown an increase of 655,400 cu.ft.

Tenders are Invited by the Birkenhead Gas Department for repairs to No. 1 gasholder tank at an estimated cost of £2,000 and for the installation of a new three-lift holder with a storage capacity of 1 million cu.ft., utilizing the existing tank and foundations, at an estimated cost of £14,000.

To Abate Smoke Output the Manchester Housing Committee has given authority for an experiment to be carried out, in conjunction with the Gas Department and the Coal Utilisation Council, in regard to a gas-fired coal grate. This appliance was described in our issue for Jan. 20, 1937.

The Lighting Committee of the Oldham Corporation for the year ended March 31, 1937, states the saving of gas by automatic controllers set to extinguish at midnight is 21 million cu.ft. Thirty-seven additional gas lamps have been fixed during the year, the present consumption of gas being 59,360,000 cu.ft., an increase of 4,053,000 cu.ft. on last year.

The Following British Standard Specifications recently issued may be obtained, price 2s. each, from the Secretary of The Institution of Gas Engineers, 1, Grosvenor Place, S.W. 1: No. 363-1937, Land Aerodrome and Airway Lighting; No. 700-1937, Graduated Pipettes and Straight Pipettes; No. 733-1937, Density Bottles; and No. 188-1937, Determination of Viscosity of Liquids in Absolute (C.G.S.) Units (superseding No. 188-1929).

Film Shows are to be given at the Housing Centre, 13, Suffolk Street, Haymarket, S.W. 1, on the second Monday in every month except August. On Monday last the show was arranged by the London Film Institute Association, 4, Great Russell Street, and among the films shown were some of the Gas Light and Coke Company's publicity films, including the Nutrition Film, which were introduced by Mr. R. B. Williams-Thompson.

Negotiations Have Been Completed whereby the Steel Company of Scotland, Ltd., has agreed to take from the Lanark County Council Gas Undertaking a supply of gas for a furnace being installed at their Hallside Works, Cambuslang. It had been indicated by the Company that the furnace would require approximately 35 million cu.ft. of gas per annum. It will be necessary to lay a new main to the steel works at an estimated cost of £1,240.

Cookery Demonstrations were recently held by the Gas Undertakings at Long Eaton and Blackburn in collaboration with Messrs. Falk, Stadelmann, & Co., Ltd. The Long Eaton demonstrations were held from June 14 to 19; Miss E. Deakin was the demonstrator, and the attendances totalled 1,140. At Blackburn the demonstrations lasted longer, terminating on June 25. The demonstrator for this series was Miss M. A. Fielden, and the attendances totalled 593.

A Ten Years' Contract for the lighting of Haslemere has been obtained by the Haslemere and District Gas Company in keen competition with electricity. The scheme embraces a general re-organization of the system on modern lines, and includes about three miles of main road lighting designed to conform with the General Interim Report of the Ministry of Transport on Public Lighting, giving a generous Class "F." It is gratifying to learn from the Managing Director and Engineer, Mr. R. E. Taylor, that the whole of the public lighting in the area of supply of the Haslemere Company is now by gas.

CURRENT EVENTS IN THE GAS INDUSTRY

Amalgamation and Grouping

Associated Utilities and Reading.

A majority of the share and stock holders in the Reading Gas Company have accepted the recent offer of Associated Utilities, Ltd.

Associated Utilities, Ltd., was formed in 1933 by, and under the control of, the Mid-Southern Utility Company. The address is that of the parent Company—viz., 92, Victoria Road, Aldershot. The Company has already acquired the Basingstoke Gas Company.

Northampton, Newport Pagnell, and Olney.

The Northampton Gas Order, 1937, was passed by the Board of Trade on June 11, 1937.

Under this Order the Newport Pagnell Gas Company and the Olney Gas Company were taken over by the Northampton Gas Company as from July 1, 1937.

Gas will continue to be manufactured at Newport Pagnell and Olney for the present, but the Olney Company will be closed down for manufacture within three years and gas will be supplied from Newport Pagnell. The Order also includes a large extension of area of supply.

Co-operation with the Schools

Watford Company's Educational Services

The Watford and St. Albans Gas Company have in the past frequently co-operated happily with headmasters and headmistresses in arranging items of interest for their pupils. So successful have these proved that the Company's Publicity Department have issued an attractive little folder setting out the full range of the Undertaking's educational services which are at the disposal of local schools.

First, there is a visit to the gas-works; parties up to 30 may be conducted by a guide round the Company's works at Watford, St. Albans, or Hemel Hempstead. Tours, which usually last from an hour to an hour and a half, can be arranged for the morning or the afternoon. Many visits to the works terminate with an inspection of the Company's up-to-date showrooms, where pupils, having seen how gas is made, can see for themselves the many ways in which it is used.

The documentary film of to-day is, like the radio, one of the newest forms of educational media. Its advantages have already been praised by many authorities, and the Watford Company will arrange programmes of up to 2½ hours' duration in a suitable room, at the schools, or in their own showrooms.

Finally, the Company have on their staff a lady cooking and dietetic expert who is always pleased to arrange demonstrations for classes of schoolgirls either at the showrooms or the school itself. The Company are to be congratulated upon their enterprise in offering this educational service to the local schools.

Personal

Mr. RAYMOND PRINCE, Engineer and Manager of the Loughborough Gas Department, has been appointed Engineer, Manager, and Secretary of the Peterborough Gas Company in succession to the late R. Wardell. He has been at Loughborough since 1931, and will take up his new duties at an early date. Before going to Loughborough, Mr. Prince was Engineer and Manager of the Heywood Gas Department and Assistant Engineer at Tipton.

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Mr. ARTHUR THOMAS MANDER, a foreman meter inspector who has been in the employ of the Cheltenham and District Gas Company for forty-three years, was recently the recipient of a writing desk from his colleagues. The presentation, which was to mark Mr. Mander's retirement, was made by Mr. A. L. Morris, Accountant and Commercial Manager of the Company.

In This Week's "JOURNAL"

The Southern Association at Southampton.

Members of the Southern Association of Gas Engineers and Managers will long remember "President's Day, 1937," as one of outstanding enjoyment. In addition to being enabled to see for themselves some of the up-to-date methods which have made their President's undertaking a shining example of contemporary gas practice, the members experienced—many of them for the first time—the hospitality for which the Southampton Gaslight and Coke Company are well known. The record gathering was evidence, therefore, not only of a popular President, but also of pleasurable anticipation of a day of absorbing interest—as, indeed, it turned out to be. The Company, in fact, left no stone unturned to give their guests a right royal time.

See p. 110.

Gas Cooking for New Exhibition Building.

Described as one of the most remarkable building feats of modern times, the new Earl's Court Exhibition Building, covering an area of 9 acres, ranks among the largest buildings in the world. The Building, which is now in process of completion, has been provided with facilities for catering for many thousands of meals a day for both visitors and staff, and the huge kitchens, fully equipped with all the most modern apparatus, exemplify the unassailable position which gas holds to-day in the large-scale cookery field. In addition, no less than six miles of gas services have been laid within the building to serve the needs of individual exhibitors.

See p. 113.

Mr. R. N. Webb's Presidential Address.

Concluded this week is our report of Mr. R. N. Webb's Presidential Address before the Manchester District Association of Gas Engineers in Leeds on July 2. Mr. Webb goes on to describe the coke handling methods at the New Wortley Works, Leeds, followed by a reference to the benzole and chemical washing plant. Finally, he speaks of the Education Scheme of the Institution and urges the younger members of the Industry to take advantage of membership of Junior Associations.

See p. 119.

Midland Junior Gas Association

Visit to Buxton Gas-Works and the Derbyshire Silica Firebrick Company

Members of the Midland Junior Gas Association travelled by motor coach to Buxton on July 1, 1937. The morning was devoted to an inspection of the Gas-Works, which includes an installation of new Glover-West continuous vertical retorts with waste-heat boiler and coke screening and storage plant. The members were conducted over the plant (which was fully described in the "JOURNAL" for Oct. 21, 1936) by Mr. F. G. Shaw, Engineer and Manager, the Chief Assistant, Mr. H. H. Knowles, and Mr. S. L. Stokes, Junior Assistant.

Situated as it is in the beautiful Ashwood Dale, the design and construction of the new retort house, built of Stancliffe artificial stone, was greatly admired. The detailed completeness of the carbonizing and auxiliary plant, and the extremely well-lighted and efficient lay-out, received favourable comment. Close attention was given to the interesting technical developments in connection with producers, which are utilizing fine breeze.

The party adjourned to the Palace Hotel, Buxton, for luncheon, during which the President of the Association, Mr. F. A. Jenkins, thanked Mr. Shaw and his staff for giving them the opportunity of seeing this modern carbonizing plant and for the information so candidly and clearly given to all their enquiries.

Mr. Shaw, in reply, said that he was always very pleased to show the plant to members of the gas profession. He had enjoyed their company and trusted they had found something of interest to all. He, himself, usually learnt something when he visited other works, and he considered that these visits were very useful to all concerned.

In the afternoon a visit was paid to the Works of the Derbyshire Silica Firebrick Company, Ltd., at Friden, where the manufacture of silica, siliceous, fireclay, and sillimanite refractory materials was seen in all its stages. The firm, whose works cover about 7 acres, have an output of about 900 tons weekly, made from the silica obtained from their estate of about 800 acres at Friden and their Ganister quarries in the South Wingfield area. In addition to the refractory materials there was also seen the manufacture of "Dome" insulating bricks made of diatomite imported from Northern Ireland. The Works are well equipped with machinery and kilns for the production of the finest types of refractories and have a well-appointed laboratory where constant check is kept on all stages of the manufacture and where research is constantly carried out, with a view to improving the products of the Company.

After a most interesting tour of the Works, the party was entertained at tea in the staff dining room at the Works.

The President, in thanking Mr. Frank West and his fellow Directors for the hospitality afforded to the members, said that he had been pleased that day to renew an acquaintanceship with Mr. Ronald Glover, which dated back from his early days in the Gas Industry.

A vote of thanks to the Directors and staff of the Company, proposed by Mr. E. T. Pickering, B.Sc. (Birmingham), and seconded by Mr. A. W. Attwood (Coventry), was carried with acclamation.

In reply to the vote of thanks, Mr. Frank West said that they were always pleased to receive visitors. The Works were started 45 years ago by Mr. John West, chiefly for the manufacture of gas-works refractories. Although the district was noted for its antiquities, yet he hoped they had found the Works to be up to all modern requirements, and that they had enjoyed the visit and found the inspection of the Works and laboratories both instructive and interesting. He would be pleased to see them again in the future, either as an Association or individually.

On the return journey the party stopped to inspect one of the pits from which the raw siliceous materials are obtained.

Presentation to Sir David Milne-Watson

Tenth Anniversary of Watson House

On July 6 at Watson House, Sir David Milne-Watson, LL.D., D.L., Governor of the Gas Light and Coke Company, was presented with a bronze bust of himself by Mr. T. C. Gardner, a blacksmith working at Watson House, who has had 31 years' service with the Company. Mr. Gardner was selected by vote to represent the workmen subscribing to the presentation, which was to mark the tenth anniversary of the founding of Watson House and its recent removal to more modern premises.

The function was attended by over 500 employees and their wives. A bound volume containing the names of the subscribers was handed over at the same time as the bust, which is the work of Mr. Eric Schilsky. The function was followed by a buffet tea attended by Sir David and Lady Milne-Watson. A bouquet was presented to Lady Milne-Watson by Miss Pamela Norwood, five-year-old daughter of one of the Training Instructors.

Association of Public Lighting Engineers

New Members

The following have been received into membership of the Association of Public Lighting Engineers:

Members.—Dawson, F. (Herne Bay), Gould, J. A. (Sydenham), Lewis, E. W. (Purley), Mainwaring, H. (Manchester), Heaton, M. (Middleton), and Stewart, E. A. (Wardle).

Junior Members.—Frobisher, C. M. (Manchester).

Associates.—Allsopp, H. M. (Leeds), Gatton, T. (London), Prowse, J. A. (London), and Tye, L. M. (London).

British Gas Federation

Council Meeting

A meeting of the Council of the British Gas Federation was held at Gas Industry House on Wednesday, June 30, at 11 a.m. Sir DAVID MILNE-WATSON, Bart., LL.D., D.L., presided.

Regulations for Gas Equipment of Domestic Premises.—A report was received from the Committee appointed to consider this matter. It was unanimously decided that the Draft Regulations should be referred to The Institution of Gas Engineers for consideration by their Council on July 13.

A vote of thanks was passed to the Committee for the expeditious way in which they had dealt with this matter, and for the valuable report which they had submitted. It was also decided that the revision of the brochure entitled "Instructions for Fixing Geysers" should be referred to the same Committee, and that the Committee should have power to co-opt individuals with special technical knowledge.

Exhibitions.—A report was received from the Exhibitions Committee dealing with the following, among other, matters: British Industries Fair, Castle Bromwich; Ideal Home Exhibition, Olympia; Empire Exhibition, Scotland, 1938.

Report from the Joint Committee on Public Lighting.—The report from the Sub-Committee which had been set up to investigate this matter and to report thereon was submitted and approved.

National Smoke Abatement Society.—The removal of the Headquarters of the Society from Manchester to London was reported. Consideration was given to the steps which should be taken to secure further contributions to the funds of this Society.

Ninth Annual Conference of the National Smoke Abatement Society to be held at Leeds from Sept. 30 to Oct. 2.

It was reported that Mr. C. S. Shapley and Mr. J. G. Clark had been nominated by the B.C.G.A. as their representatives, and it was arranged that the other Constituent Bodies should also nominate representatives.

Association of Public Lighting Engineers' 14th Annual Conference to be held at Folkestone, Sept. 6-9.

The arrangements which were being made for the demonstration of public lighting by gas at this Conference were reported.

Third Annual Dinner of the British Gas Federation.—It was reported that arrangements were being made to hold this function on Wednesday, Nov. 3, 1937, at Grosvenor House, Park Lane, London, W. 1. Full particulars will be issued to Members of the Federation shortly.

Joint Secretaries.—Mr. J. R. W. Alexander took leave of the Council on his resignation as Secretary of The Institution of Gas Engineers, and a hearty vote of thanks was passed to him for the work he had accomplished for the British Gas Federation.

Dr. W. T. K. Braunholtz, M.A., F.I.C., was unanimously elected to serve as Joint Secretary in place of Mr. Alexander.

The Coal Industry

Statement for the First Quarter of 1937

The following statement is issued by Mr. Philip Gee on behalf of the Mining Association of Great Britain:

The Mines Department's Statistical Summary for the March Quarter of 1937 records an output of saleable coal amounting to 58,499,743 tons, which is 57,017 tons less than in the corresponding quarter of 1936. It must, however, be remembered that, as was pointed out recently in the *Board of Trade Journal*, 1936 was a leap year and that Easter fell within the quarter in 1937, but not in 1936. Had the number of working days been the same as during the corresponding quarter of 1936 the output would have been greater than it was by about 2¼ million tons.

Another relevant factor was that, as compared with the March quarter of 1936, there was an increase of no less than 651,243 in the number of manshifts lost which could have been worked. This increase doubtless reflects the incidence of the influenza epidemic; but whatever the cause, on the basis of an average output of 24 cwt. per shift, it represents a loss of output amounting to 781,492 tons.

In view of the fact that the marketing schemes were in operation during the quarter in 1937, but not, except in Lancashire and Cheshire, in the same quarter of 1936, particular interest attaches to the comparative figures of the proceeds of commercial disposals. In the March quarter of 1936 the average was 14s. 8½d. per ton; in December, 1936, 15s. 0½d.; and in March, 1937, 15s. 6½d.—an increase of only 10d. per ton over the corresponding period of the previous year. This suggests that a very large proportion of the output was still being sold under long term contracts. (The voluntary increase of 1s. per ton conceded by certain large consumers on their existing contracts became operative during the March quarter of 1936.)

Total costs rose, as compared with the corresponding quarter of 1936, by 6¼d. per ton, of which wages cost accounted for 3¾d. It is anticipated, however, that costs other than wages may rise considerably during the remainder of the present year, owing to the very substantial increases in the current prices for all materials, and particularly steel and timber.

The money earnings of the miners averaged 10s. 4·18d. per shift as compared with 10s. 1·10d. in the December quarter of 1936, with 9s. 11·86d. in the March quarter, and with 9s. 3·91d. in the December quarter of 1935. They were therefore rather more than 1s. per shift higher than they were 15 months ago. Including allowances, the average earnings of all wage-earners at the mines, including boys and surface workers, were 10s. 9d. per shift—the highest figure for ten years.

The "credit" (which is struck before allowing for interest on debentures, bank loans and overdrafts, and certain other items, estimated to amount to 3d. per ton) was 1s. 9½d. per ton, which compares with 1s. 5¾d. in March, 1936, and 1s. 5d. in December, 1936.

A Building Centre for Scotland

Scottish Development Council Move

At a meeting recently held at the Rankine Hall, Glasgow, convened by the Scottish Development Council, for the purpose of discussing their proposal to establish a Building Centre in Glasgow, Lord Elgin, President of the Council, presided. There was a very large representative audience of architects, manufacturers, and others engaged in the Building Industry.

Lord Elgin, in the course of his opening speech, said that he had visited the London Building Centre, which had been in existence for a number of years, and had been impressed with the efficiency and usefulness of the services given in that centre.

Mr. Yerbury gave a general description of the London Building Centre. He stated that during the last year the total number of visitors was 68,776 as against the previous year's total of 50,929, and that 97,000 technical enquiries had been dealt with. Mr. Yerbury also answered numerous questions put to him by members of the audience on various points regarding the London Centre. Sir Steven Bilsland expressed indebtedness to the initial work of Col. Gardner-McLean which had led up to the meeting, and also said they were much interested in what Mr. Yerbury had said. He had visited the London Building Centre on several occasions, and had always been much impressed with its usefulness and felt that such a Building Centre in Scotland was needed. Sir Steven Bilsland then moved that the meeting recommended the Scottish Development Council to take immediate steps to establish a Building Centre in Scotland. This was seconded and carried unanimously.

James Keith & Blackman Company, Ltd.

Annual General Meeting: New Tottenham Factory

The Annual General Meeting of Messrs. James Keith & Blackman Company, Ltd., was held on June 25, Mr. G. Keith in the Chair. Mr. Keith in the course of his Address said that during the financial year under review there was a very substantial advance in the volume of business done, which reflected itself in the fact that the net profit was nearly 65% higher than for the year 1935-36. The year's output was the highest in the history of the Company. The firm had now succeeded in purchasing approximately 11 acres of freehold land adjacent to Ferry Lane, Tottenham. For a number of years they had been working under cramped conditions at Holloway; in consequence, they had been unable to reap the full benefit of the increasing volume of business owing to the fact that they had had to buy outside products that, with additional manufacturing facilities, they would in future be able to make themselves more profitably.

The proposed new Works at Tottenham would consist of a one-storey building covering over 7 acres. The factory had been designed in collaboration with the well-known Factory Architects, Messrs. S. Clifford Tee & Gale, in such a way as to secure a progressive flow of work through the Shops from the arrival of the raw material to the despatch of the finished product. Modern machinery and

appliances would be installed, ensuring economical production. When completed, the output capacity would be about double that of the Holloway Works. The block of General Offices to which their Registered Office would be transferred would accommodate the combined Head Office Executive and Technical Staff and also the London Works Staff. A City Office would be maintained from which their London Representatives would operate. The buildings would be completed in stages, so that work could be transferred from Holloway in sections without disorganizing the output, and it was expected that the whole scheme would be finished in about 18 months.

The Directors proposed to increase the nominal capital of the Company to £500,000, divided into 200,000 5½% cumulative preference shares of £1 each, and 600,000 ordinary shares of 10s. each, involving the sub-division of the existing issued ordinary shares.

It was decided to change the name of the Company to Keith Blackman, Ltd.

Coke for Steam Motor Waggons

Important New Legislation

It is now at last being generally realized that the present dependence of British transport and other activities upon imported petrol and Diesel oil must be reduced to an enormous extent, and replaced as much as possible by coal, or gaseous, liquid, and solid products derived from coal.

The steam motor waggon is now going to be an important field for coke since the new alterations in the Road Traffic Act (Ministry of Transport) remove to a partial extent the severe handicap under which the steam vehicle has been suffering, as compared with the petrol and the Diesel engine vehicle.

In general all types of 4-wheel vehicle, steam, petrol, and Diesel engine, were limited to a gross weight of 12 tons. Since a steam vehicle, with boiler, coke or coal fuel, and water, weighs more than a petrol or Diesel vehicle the actual payload was much less. This, however, is most unjust to the steam vehicle because the latter, for equal gross weight, exerts less wear and tear on the roads, due to the uniform turning of a steam engine as against the " impulsive " motion of an explosive engine operating through a clutch and speed change gear box.

Some years ago the permissible gross load of the 4-wheel steam vehicle was raised to the insufficient figure of 13 tons, but now 14 tons is allowed, which alters the whole situation, bringing the payload up to that of the petrol and Diesel engine vehicle.

The position is well illustrated by the case of the " Sentinel " steam waggon, well-known in the Gas Industry. Incidentally 13 of these waggons, 4-wheel type, are at present being built to the order of a London gas company for the transport of coke.

The Sentinel Waggon Works (1936), Ltd., Shrewsbury, are the only firm in Great Britain who have continued to manufacture steam waggons in spite of the fact that over 5,000 waggons, using coal and coke, have been driven off the roads because of the legislation mentioned, although the position is now going to be very different. As a result of intensive research based on long practical experience the firm's standard 4-wheel waggon has now been brought down to a weight of 4¾ tons empty, or 6¼ tons when fully provisioned with coke and water, corresponding to a payload of 7¾ tons. The average petrol or Diesel engine vehicle weighs up to 4½ tons and the payload is therefore 7¾ tons (12 tons permitted gross load).

Although the concession for steam 6-wheelers is at present not equivalent to that for 4-wheelers, and nothing has yet been done for the 8-wheeler, the national importance of the steam vehicle has now been officially recognized.

The standard Sentinel " S " models, 4-wheelers, rigid 6-wheelers, and rigid 8-wheelers, having a range of standard bodies, with or without trailers, embody many important features. For example, the special boiler is of the vertical type with inclined straight cross tubes, operating at 255 lb. per sq.in. pressure and incorporating a superheater. Hand or mechanical stoking can be used, although the former is preferable for coke, with two men in the cab. The firegrate is of cast steel, much lighter than cast iron, while the water tanks hold 165 gallons, sufficient for 40-60 miles. Also the fuel capacity is 3¼ cwt. coke, sufficient for 65-75 miles, or 6½ cwt. coal for 150-180 miles. The boiler feed pump is of the slow double acting variety, with hand or automatic control. The engine is an advanced design of the 4-cylinder, single acting variety, weighing 9 cwt., and developing 120 b.h.p., with a steam consumption of 14 lb. per b.h.p.

As regards the drive, this is of the direct shaft type, and the transmission includes a ¾ floating back axle, spiral bevel drive, and double reduction gearing. In addition, there is a 2-speed gear box, the top being direct drive and the second a 2·72:1 ratio, while the chassis is a heavy nickel steel frame, and the pneumatic tyres are 36 in. by 8 in. high pressure, or 10½ in. by 20 in. low pressure. Two powerful independent sets of brakes are also provided, one hand and the other steam operated, while all the gear and axle shafts have roller bearings, and there is a completely enclosed saloon cab.

The 4-wheeler also (S4), as indicated, has a payload of about 7¾ tons, the 6-wheeler (S6) 10-11 tons, and the 8-wheeler (S8) about 13 tons, all solo, with extra when trailers are used.

Athletic and Social

Bognor Outing.

The fifth annual outing of the employees of the Bognor Gas and Electricity Company took place on June 5. Arriving by motor coach in London, the company were entertained at lunch at the Victoria House Restaurant, after which visits were paid to various places of interest. The Board of Directors were represented by Mr. F. G. Watson, Secretary, who welcomed the party on their behalf.

Gas Companies' Tennis : Northampton Win Shield.

The first inter-Gas Companies' lawn tennis tournament was played at Cambridge on June 26, on Trinity College courts, by kind permission, between teams representing Bedford, Watford and St. Albans, Northampton, and Cambridge. The performance of one of the Cambridge pairs, F. Halcrow and G. Keillor, is worthy of record, as they won in every match.

The final placings and scores were: Northampton—won 23, lost 4; Cambridge—won 14, lost 13; Watford and St. Albans—won 13, lost 14; and Bedford—won 4, lost 23.

A dinner was held in the evening, the chair being occupied by the Engineer and Manager of the Cambridge University and Town Gas Light Company (Mr. J. Hunter Rioch), supported by Major H. McCombie, a Director of the Company, and several officials from the visiting companies. In presenting the Shield, the Chairman said he felt that functions of this nature were of very great value indeed for the interchange of ideas and for the fostering of the team spirit. That spirit, he believed, was developed to a large extent in the Cambridge Company. " I hope," concluded Mr. Rioch, " that the Shield will not stay too long in Northampton."

The captain of the Northampton team, Mr. Brain, thanked the Cambridge club for the efficient manner in which the arrangements had been carried out, and hoped that the encounter would be the forerunner of many in the future. Major H. McCombie congratulated the victors. Mr. Halcrow, as captain of the Cambridge team, added his congratulations to the winners and to the secretary for his work. It was announced that the tournament will be held at Bedford in 1938.

Hastings Success in First Round of S.E.G.C. Tournament.

The Hastings and St. Leonards Gas Company team was successful in surviving the first round of the South Eastern Gas Corporation Lawn Tennis Tournament by a win over the Folkestone Gas and Coke Company by 5 matches to 2.

Oxford v. Reading at Tennis.

The annual return tennis match between the Reading Gas Company and the Oxford and District Gas Company took place on Saturday, July 3. The match was played on Trinity College Ground, Oxford, and resulted in a win for Reading by five matches to four.

The games were all well contested, and the result in doubt until the final set of the match, which went to Masters and Wardle against Caton and Standing at 9—7. Reading thus took revenge for their defeat earlier in the season, when they were beaten by Oxford for the first time.

The Southern Association Visit Southampton

A most enjoyable day was spent by members of the Southern Association of Gas Engineers and Managers on July 9, when they were the guests of their President's Company at Southampton.

If Dover is the "Gateway to the Continent," then Southampton may justly be regarded as the "Gateway to the World;" and in such an atmosphere, with all the fascinating associations inherent in a seaport town which handles the shipping of the world, the stage was set for a successful gathering of members of the Southern Association of Gas Engineers and Managers and their ladies last Friday. But atmosphere alone cannot make for a successful meeting, and it was due in large measure to the generosity of the Southampton Gaslight and Coke Company, of which the Association's President, Mr. S. E. Whitehead, is Director, Engineer, and General Manager, that the visit was so enjoyable. Indeed, the Company left no stone unturned to make the visit a memorable one for their guests.

The members assembled in the morning at the Gas-Works, where they were enabled to see for themselves the reason why their President's Undertaking is in such a thriving condition. The Southampton Gas-Works, including gasholders, meter and stove shops, stores, garage, &c., occupy only 15½ acres—which is small for a maximum daily output of over 7 million cu.ft. Seaborne coal is delivered alongside the wharf in steamers carrying up to 2,200 tons, and unloaded by two electric cranes which deposit it, via hoppers and band conveyors, into the breaker. The broken coal is weighed and distributed to the various stores by band conveyors, this system being used for practically all handling of materials throughout the works. The carbonizing plant consists of 25 beds of horizontal retorts and four beds of intermittent vertical chambers erected by the Woodall-Duckham Company, together with water gas plant. Particular attention is paid to coke grading and screening, for which a plant capable of dealing with 30 tons per hour is installed.

The storage capacity of the works is approximately equal to one day's supply of gas. Extensions to the purifier plant were recently commenced, six cast-iron boxes each 40 ft. by 30 ft. to be erected on a reinforced concrete structure 13 ft. above ground level. From these spent oxide is discharged through bottom doors in the usual way, while new material is fed to the boxes by elevator and shuttle belt conveyor. This set of purifiers presents two somewhat novel features. First, hydraulic valves are used throughout, each consisting of a U-pipe giving a total seal of 40 in. and provided with water inlet and outlet, &c. It is hoped by this means to obtain a really positive valve, and to avoid the falling off in efficiency of the plant which sooner or later makes itself felt by reason of leaking disc valves. Secondly, the six boxes are arranged in series, without the normal provision of catch boxes. This arrangement enables the full effectiveness of all the boxes to be obtained as compared with the partial utility of the catch boxes, while the purifying material is rendered fully spent with a minimum number of changes. All six boxes are "swung" in rotation, the only precaution necessary being the maintenance of two clean boxes at all times.

There is crude benzole recovery and gas dehydration plant at the works, the production of benzole being 2·1 gallons per ton of coal of a quality of 71% at 120°. An alteration made in the benzole washer is of interest; at first the gas passing to the benzole half of the washer was a mixture of coal gas and water gas. But it was realized that the water gas had the effect of diluting the coal gas and thus reducing the efficiency of extraction, and that blue water gas (which is usually made) contained neither benzole nor naphthalene. A by-pass was therefore put in by means of which blue water gas was mixed with the coal gas at a point between the benzole and calcium chloride halves of the washer, the full concentration of benzole in coal gas being thus obtained in the former.

Guests of the Company at Luncheon.

Following the tour of the gas-works, the members had the opportunity of inspecting the Company's very fine showrooms, after which they were joined by the ladies for luncheon, at the kind invitation of the Southampton Gaslight and Coke Company, at the South-Western Hotel—Brig. E. M. JACK, C.B., C.M.G., D.S.O. (Deputy-Chairman of the Company), presiding in the regrettable absence through indisposition of the Chairman, Sir Russell Bencraft, J.P.

The Loyal Toast having been duly honoured, the Chairman proposed the Toast of "The Southern Association and Other Guests." Before doing so, however, he expressed great regret at the absence of Sir Russell Bencraft, who had been looking forward to being with them on that occasion. Continuing, Brig. Jack said it was a privilege to propose this toast, and it was a great pleasure to the Directors of the Southampton Company to see such a large gathering at that meeting; it was, he believed, a record attendance. This was as it should be, because the Southern Association was one of the largest of the District Associations, numbering over 330 members, in addition to being one of the oldest, having been founded as long ago as 1875. He congratulated the Association upon its flourishing condition and voiced his great pleasure that they were the Company's guests that day. That pleasure was enhanced by the fact that their esteemed Engineer and General Manager, Mr. S. E. Whitehead, was their President. Among others present, went on the Chairman, was the Association's Vice-President and also their efficient Hon. Secretary, Mr. W. A. Howie, as well as a number of Past-Presidents. To all those members he extended on behalf of his fellow-Directors a very warm welcome, with the hope that they would enjoy their visit to Southampton and carry away pleasant memories of it. Apart from the Southern Association—although many of them were also members—there were a number of distinguished guests. Among these he mentioned the names of Mr. H. C. Smith (President of The Institution of Gas Engineers), Mr. R. Robertson (Senior Vice-President), both of whom were Past-Presidents of the Southern Association; then they had from their neighbour Undertaking at Portsmouth Dr. F. E. Bedow (the Chairman of the Company) and Mr. Thomas Carmichael (Deputy-Chairman), who was also a fellow-Director of the Southampton Company, and Mr. F. Kilpatrick and Mr. F. R. Snook (Directors). Others present included Lieut.-Col. H. W. Woodall, Director of the Bournemouth Company, Mr. A. L. Holton, immediate Past-President of the Manchester District Association, Mr. F. B. Richards, immediate Past-Chairman of the Council of the Society of British Gas Industries, and Mr. R. Summerson, President of the London and Southern District Junior Gas Association. He also added a special word of welcome to the ladies.

They were delighted to see so many there on that occasion, and he hoped they would enjoy themselves as much as the Company enjoyed their presence. With the Toast he coupled the name of the President; they were very proud that their Engineer and General Manager should hold this high position in the Association. The other name he would couple with the Toast was that of Mr. H. C. Smith, President of the Institution, whom they were pleased and proud to have with them that day.

Appreciation from the Association.

Responding to the Toast, Mr. WHITEHEAD said his first duty was to thank Brig. Jack most sincerely on behalf of the Association for the very kind welcome he had extended to them and for the cordial terms in which he had proposed the Toast—which they greatly appreciated. The President associated himself with all the Chairman had said about the absence of their dear old friend, Sir Russell Bencraft; he was a great friend of everyone in the Southampton Company. Brig. Jack, however, had stepped very ably into the breach. He suggested that the Association send a message of sympathy and regret at his absence to Sir Russell, together with their best wishes. It was no new experience to Mr. Whitehead to have to say "thank you" to Sir Russell Bencraft and Brig. Jack, and it was always a great pleasure to do so. On behalf of the Association and the ladies he thanked the Chairman most sincerely for his wonderful hospitality and kind welcome.

Mr. H. C. SMITH, also responding to the Toast, observed that there was no need for him to speak on that occasion

of the connection between The Institution of Gas Engineers and the Southern Association of Gas Engineers and Managers. The guests that day shared with the Company their keen regret at the absence of Sir Russell Bencraft. Those who had been privileged on occasions to be entertained by him knew what they had missed that day in his cheery presence and realized how much he must be missing not being with them. They also knew of the keen interest Sir Russell took in their affairs. His place had been admirably filled by Brig. Jack, who, besides being a very distinguished soldier, was also one of the kindliest of men. The Association's President and he, went on Mr. Smith, commenced their training in the Gas Industry together nearly thirty years ago, and he had known Mr. Whitehead all through his professional career; he was delighted to see him occupying the position he did that day. In conclusion, Mr. Smith thanked the Chairman very much for the way he had proposed the Toast and assured him how much they had enjoyed the Company's hospitality.

Admiration for the Company.

The Toast of "The Southampton Gaslight and Coke Company" was submitted by Mr. D. C. Cross (Vice-President of the Association), who also associated himself on behalf of the members with all that had been said in regard to Sir Russell Bencraft. There was a saying, said Mr. Cross, "Don't spend to-day admiring what you did yesterday." But they would like to spend just a few moments admiring what the Southampton Gaslight and Coke Company had done. First, they admired the progress they had made in the face of electrical competition, especially since Mr. Whitehead had taken charge; there had been an increase of 25% in both the number of consumers and gas sales—which was a very fine achievement. Secondly, they admired the policy of the Company in calling together such an able body of Directors. They had seven, and they were all outstanding personalities, which added tremendous strength to the Undertaking. That was the secret of their progress, and it enhanced the prestige of the whole Gas Industry. Then, they had to admire the gas-works and showrooms; the condition of the works and plant which they had seen that day was of the highest order, and they congratulated Mr. Whitehead upon it. Again, they admired the wisdom of the Company in securing the services of a brilliant Gas Engineer, and, having done so, in taking advantage of his qualifications by electing him to the Board.

Finally, Mr. Cross voiced the appreciation and thanks of the Association for the hospitality shown to them. They were very grateful for all the arrangements which had been made, for the welcome which had been extended to them, and also for the outing they were going to enjoy during the afternoon. In asking them to drink the health of the Southampton Company, he coupled with the Toast the names of Mr. A. W. Oke and Mr. Thomas Carmichael, Directors of the Undertaking.

Mr. A. W. Oke, in acknowledgment, remarked that his father had been a Director of the Company before him for 33 years, and he himself had watched the development of the works since the time when Mr. John Paddon was Engineer. He congratulated the Association on having visited Southampton; they were proud that their Engineer should be the President of this important Association. Such organizations did much good, and he always advocated sending their engineers to attend their meetings.

Mr. Thomas Carmichael said how much he appreciated the kind references to Sir Russell Bencraft; they all loved him in Southampton, and he was a very able and considerate Chairman, whom they were very fortunate in having. Secondly, he was personally very proud indeed that his old friend Sidney Whitehead had been elected to the Presidency of this Association. He had known him longer, perhaps, than most of them in that room, and knew him to be a most loyal and efficient official—and he hoped they had found him a loyal and efficient President. Mr. Carmichael expressed his pleasure that the Association had come to Southampton for their summer meeting, and he hoped everyone, including the ladies, would take away pleasant memories of that visit.

In conclusion, the Toast of "The Chairman" was cordially accepted on the proposition of Mr. Thomas Glover, and briefly acknowledged by Brig. Jack.

On Southampton Water.

After luncheon the members and their ladies were the guests of the Company on a most enjoyable trip on Southampton Water. Embarking on one of the comfortable vessels which is normally engaged on the Isle of Wight service, the party were forced at the outset to shelter "below" from the elements for a little while; but the Clerk of the Weather soon relented, and conditions rapidly improved as the afternoon wore on, until, by teatime, all was "set fair."

A cruise round Southampton Water is always full of fascination for the "land-lubber," but the party on this occasion were particularly fortunate in the number and variety of ships which were seen. On the horizon loomed the vast bulk of the "Berengaria," and we watched that veteran of the Atlantic service steam slowly and majestically in, to be picked up by her attendant tugs and shepherded to her berth, where the usual crowds eagerly awaited her arrival from the New World. After what seemed like an age of skilful manœuvring she was gently nosed to the quay-side and at last safely tied up alongside, close to the "Empress of Australia," another monster of the seas, shortly due away on a cruise.

Out on the Water were seen a multitude of private yachts, varying in size and luxuriousness, at their moorings, a seaplane or two, cargo vessels at anchor, and a distant glimpse of the Pan-American Clipper just in from her epic flight across the Atlantic. The Southern Railway steamer, "Isle of Guernsey," hove in sight from the Channel Islands; another boat was leaving for the Isle of Wight with a load of motor-cars—and, among all these, scores of smaller craft were constantly coming and going upon their various courses in and out of this "Gateway to the World."

The boat tarried awhile to enable her passengers to watch the departure of the "Stirling Castle," greatly admired for her beautiful lines and bright paintwork. With wonderful precision a tug fore and aft pulled her gently from the quay-side and set her off, with a farewell blast on her syren, upon her voyage to Madeira and the Cape. After tea on board the visitors returned to the pier and set foot on dry land again, having learnt a little of the day's work of Southampton Water and the part it plays in handling the shipping of the world.

The New S.R. Dock.

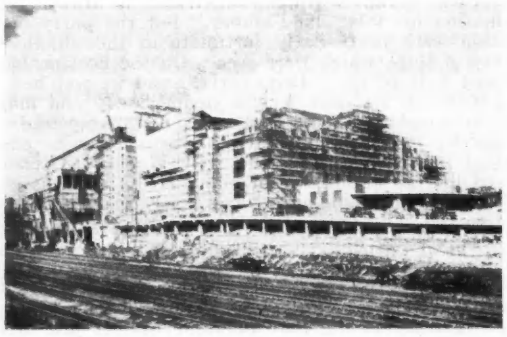
But the afternoon's entertainment was not yet over, and their hosts had planned for the party a most interesting *finale*—a tour of the Southern Railway's new dock works, reclaimed from hundreds of acres of mud-land. We hesitate to mention the number of millions of pounds which have been, literally, "sunk" into this mud in order to produce one of the finest and most modern docks in the world. Nor can we mention here the hundred-and-one interesting things we were told about the almost superhuman task which confronted the S.R. engineers and their contractors in completing this marvellous construction, but what we saw of the final achievement shows up the Railway Company in a new light. No longer the cold, impersonal, and unbending public utility, the butt of our scathing comments and ill-considered witticisms when our train is two minutes late to Town; but rather a very human undertaking, making its first concern the comfort of its passengers to and from foreign lands and an example of the welcome that should be given to visitors to the Mother Country.

Seven thousand feet of quay-wall have been firmly built upon the original mud, and behind this a series of magnificent "sheds" to cater for the passengers and their luggage in shelter from the vagaries of the English climate. Up-to-date customs facilities assist a speedy "getaway," while for passengers fatigued by their journey or for those awaiting their arrival there are splendid buffets and comfortable lounges. On the farther side of the "sheds" runs the railway track on which the Ocean Liner Express draws up within but a few yards of the ship.

Most interesting of all, however, was the inspection of the Company's new graving dock, the size of which almost takes one's breath away. Twelve hundred feet long, this giant construction has almost 200 ft. to spare when the "Queen Mary" is inside—large enough, in fact, to take any vessel sailing the seas to-day and probably for many years to come. And speaking of the "Queen Mary," it is interesting to note that this famous ship is this week actually undergoing a routine overhaul in the graving dock, where she is having two of her four giant propellers replaced by new ones. The visitors were able to inspect these two new propellers, weighing 35 tons each, which may, perhaps, enable the "Queen Mary" to regain the Blue Riband of the Atlantic.

Adjoining the graving dock is the pump house, whose four enormous pumps can empty the 58,000,000 gallons of water from the dock in less than four hours. The wonderful machinery and great electrical control panels with their colour-light indicators are a masterpiece of modern engineering.

All-Gas Cooking for London's New Exhibition Building



For this photograph, which gives a good idea of the magnitude of the building, we are indebted to Turners Asbestos Cement Company, whose products are utilized to a large extent in the construction.

The magnificent new Exhibition Building, which is now in process of completion at Earl's Court, has been provided with facilities for catering for many thousands of meals a day for both visitors and staff, and the huge kitchens fully equipped by Benham & Sons, Ltd., with all the most modern apparatus, exemplify the pre-eminent position which gas holds to-day in the large-scale cookery field.

Described as one of the most remarkable building feats of modern times, the new Earl's Court Exhibition Building, covering an area of 9 acres, ranks among the largest buildings in the world. The facts and figures relating to its construction are almost fantastic for this country; for instance, its sides are about 900, 700, and 700 ft. long respectively; the Exhibition Building contains 47 million cu.ft., weighs approximately 200,000 tons, and has some 420,000 sq.ft. net rentable area.

In order that the six lines of railway track which cut across the site should not pass through the subway and storage level of the building, it was necessary to raise the whole structure above the tunnels, in this way raising the main exhibition floor about 15 ft. above the natural level of the property. This reduced the cost of building, because it is cheaper to build in the air than in the ground. No fewer than 1,000 columns support the ground floor, some of them carrying as much as 2,000 tons; sixty girders of reinforced concrete support the columns over the railway tunnels, spanning from 40 to 100 ft. The largest girder measures 18 ft. 6 in. wide by 9 ft. high, weighs 1,000 tons, and carries the enormous weight of 4,300 tons.

Among the materials required by the contractors (Messrs. Hegeman-Harris Company, Inc.) in the construction of this vast edifice were 2,000 tons of steel and 28,000 cu.yd. of concrete to cover over the railway tunnels, while the building itself required 80,000 cu.yd. of concrete, 24,000 tons of cement, 120,000 tons of shingle, 60,000 tons of sand, 14,000 tons of reinforced steel, 125,000 cu.yd. of excavation, and no fewer than 7½ million bricks.

The interior of the building is equally remarkable. The Architect, Mr. C. Howard Crane, has so designed the main hall that all natural light is eliminated from the exhibition areas. The advantage claimed for this is that artificial illumination will provide an even distribution of light so that exhibitors, especially those dealing with materials in colours, will have the benefit of uniform conditions at all times. The scheme of lighting in the main ceiling is such that the hall can be illuminated by concealed units to almost any desired shade; it can be blue one moment, gold the next, providing a most attractive effect. Moreover, the elimination of daylight reduces heating costs, and in the summer time the temperature of the interior will be automatically kept lower by reason of the complete insulation obtained by the asbestos roof and the suspended insulated ceiling which is hung below the trusses.

Fireproof Construction.

Mention of the asbestos roof calls to mind that the whole building is to all intents and purposes fireproof, thanks to the considerable amount of material supplied by Turner's Asbestos Cement Company throughout the construction. With the recent fate of the Crystal Palace fresh in our minds, this is a very wise precaution; not only is the main roof and that over the upper side halls covered with "Turnall" Trafford tiles, but asbestos-cement plays an important part in the roof drainage system. "Everite" rainwater gutters and pipes are extensively utilized. Inside, the lining of the Empress Hall is carried out in fireproof "Turnall" asbestos-wood, providing a surface which can be readily decorated, while the electric cables have been run in asbestos-cement runways as a further safety measure.

One of the most interesting features of the main exhibition hall is the 100 ft. by 200 ft. swimming pool, which has a capacity of 2¼ million gallons of water and a floor which can be raised or lowered by hydraulic power. This floor is in three sections, each of which can be raised or lowered independently by pressing a button. When raised, the bottom of the pool can form part of the main arena, which measures 250 ft. by 350 ft. without any interrupting columns. Alternatively the platforms can be lowered and inclined to form a swimming pool the size of which can be altered to meet requirements by the elimination of one or two of the sections. The area below the pool floor is, of course, full of water, which is forced up through apertures in the platform as the latter is lowered, or drops down below as it is raised. When the desired position of the platforms is obtained they are locked in position by means of catches on the vertical guides, and the load can then be taken off the hydraulic rams. When the water is out of the pool these platforms can be terraced at various levels for such purposes as sunken gardens, while they may also be so arranged that an exhibition of heavy machinery can be placed on lower levels and viewed from above under ideal conditions.

Undoubtedly many uses which have not yet been thought of will be made possible in the area of the pool by reason of the mechanical contrivances available. The installation is, of course, expensive, but the saving in operating costs is enormous, as it would require about eight days to install a temporary floor over the pool and eight more to remove it. In addition, nearly 200,000 cu.ft. of storage space would be required to accommodate the flooring when not in use.

The exhibition hall will seat 20,000 people, while the car park, which has a reinforced concrete platform of 5 acres, will accommodate some 1,800 cars.

Such, then, in brief outline, is the story of this remarkable exhibition building at Earl's Court, which in the not far distant future may be the venue of many important national events, both sporting and commercial. With such purposes in view and the attendant crowds that may be confidently anticipated, it is natural that adequate provision must be made for the needs of the "inner man." And, like everything else in this huge edifice, catering has been provided for on a proportional scale. Which brings us to the principal *raison d'être* for this review—the extensive use of gas in the culinary departments. There are four large restaurants, each with its own kitchen facilities, thirty-two snack bars, and four lounge bars, in addition to three large conference halls which will also be equipped to serve as banqueting halls, with the necessary service facilities.

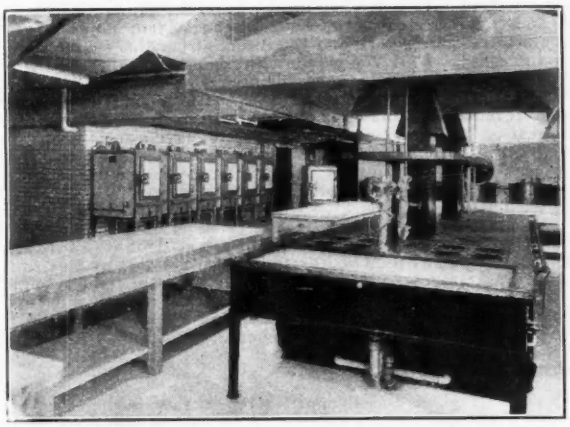
Even after having viewed the kitchens in every detail in the course of a tour of the new Earl's Court Exhibition Building—and after having our breath almost taken away by their magnitude—we will not advance any unsupportable claims that they are the largest of their kind in London, in England, or in the world. Were we to do so, someone would inevitably write to us to point out that such-and-such a kitchen is so many square feet and a boiling pan bigger. Suffice to say that they are very large indeed and a striking example as well of the pre-eminence of gas for large-scale catering. We can, at any rate, without treading on anybody's corns, truthfully say that they represent the last word in modern kitchens, and are a fine testimony to those responsible for their design and equipment.

The scheme, which, as we have said, is all-gas, comprises separate catering for the two chief ground-floor

restaurants, with smaller cafeterias for staff use. Each restaurant is complete with its main kitchen, pastry kitchen, still room, wash-up, and various other departments, including wash-up for glass and silver, rooms for fruit and flowers and linen, pot scullery, vegetable preparation room, meat and fish preparation rooms, salad and hors d'œuvres departments, and cold storage chambers.

The Gas Equipment.

Dealing first with the kitchen which is referred to as "Area 5 Basement"—the larger of the two main kitchens—the principal equipment consists of a Benham 10-unit Solid-top range with two "Chef" burners, two open-flame burners, and six standard solid tops. At one end is a bain-marie and at the other a fish boiler with counter-balanced lid. Adjacent is a 4-pan fish fryer and a double stock-pot stove, while ranged along another wall are five 40-gallon boiling pans fitted with the firm's new integral-balanced lids which make for easy opening and closing. Between each of these boiling pans is a pivot arm which can be swung into position for filling purposes, while a troughed drain runs along below floor level in front of the pans for emptying.



A View of some of the Gas Equipment in one of the Main Kitchens.

Other equipment includes seven pressure steamers, enamelled inside and out and fitted with a combined anti-vacuum and safety valve. There are two double-compartment roasting ovens and two double-compartment grillers. On the service side of the kitchen is a combined hotcloset and carving table, with two carving wells with balanced covers; the service counter is also provided with gas-heated compartments for keeping plates warm. On this side, as well, are two single compartment toasters, mounted on a hotcloset for plates, and three egg boilers and poachers.

Two Jackson tea and coffee sets and two boilers for water jugs and teapots complete the catering side of the main kitchen.

The part that gas plays in this vast kitchen is by no means finished when the gastronomical requirements of the customer have been met. There inevitably follows the unpleasant and laborious business of washing up; but, thanks to gas (which takes electricity into partnership for this process), washing up at Earl's Court is neither unpleasant nor laborious. Area 5 kitchen is equipped with a "Hercules" dish-washing machine, whereby the dirty "crocks" go in on trays at one end, are carried through the machine on an electrically-driven belt, and come out clean and bright at the other. Bulk hot water is provided by a Ruud gas water heater supplying a 350-gallon lagged storage tank; this gives the hot water direct at about 120° for the wash, while it also feeds a small gas-heated "booster" which provides water at 190° or so for the rinse. High-pressure upward and downward jets of water spray on to the crockery in the washer, the water from the very hot rinse overflowing back into the tank below the not-quite-so-hot wash. And the tanks below each section are kept hot by means of gas burners underneath.

For reasons which will be explained by caterers, it is better to keep the pastry section apart from the ordinary culinary departments, and at Earl's Court a very up-to-date pastry section adjoins the main kitchen. Here are two Collins double-decker gas baking ovens, complete with an Ellerstyle "Thermspray" boiler for supplying the necessary steam. In addition, there are two Benham double-decker pastry ovens, two proving cabinets, and an open type boiling table.

The Second Kitchen.

The equipment in the other main kitchen, known as "Area 6 Basement," is similar to that already described in the first kitchen, save that there is slightly less of each apparatus—an 8-unit range instead of 10-unit, a 3-pan fish fryer, five 40-gallon boiling pans, six pressure steamers, grillers, hotclosets, toasters, tea, coffee, and hot water sets, &c. In this case a Ruud boiler feeds a 250-gallon lagged storage tank for washing up and bulk hot water purposes.

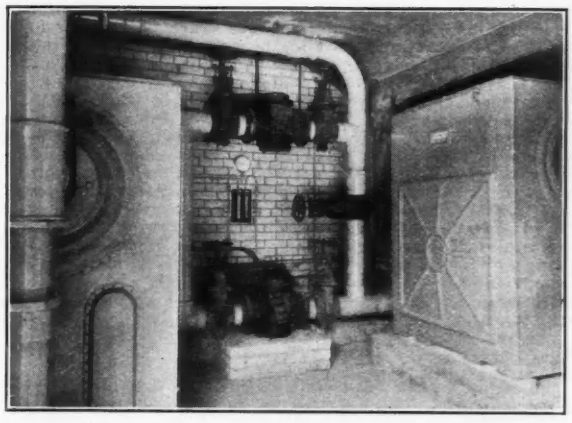
In addition to the kitchens connected with the two large public restaurants, there is other catering equipment for the caterers' staff dining-room and the cafeteria for the exhibitors' staffs. In the former are hotclosets and carving table, bain-marie, café set, and Ruud boiler for hot water; and in the latter, similar apparatus, with grillers and poachers, &c.

It will be appreciated that in basement kitchens of this nature, where an enormous amount of heat and steam—what our competitors are pleased to designate as "fumes"—is being continuously given off, adequate ventilation is absolutely essential. Particular attention has been paid to this matter by Benham & Sons, Ltd., who have installed the most elaborate and efficient ventilating equipment, together with the introduction of cleaned fresh air by means of a Plenum plant. Above the larger ranges and ovens hoods have been provided to carry away the products, while additional vents at strategic points ventilate the room as a whole into ducts, through which the vitiated air is sucked away by fans.

Benham & Sons, Ltd., have also been responsible for the entire fitting up of the kitchens, and the whole arrangement of the equipment has been carefully planned to give a proper sequence of events, while enamel and stainless steel finishes show that sight has not been lost of the essential elements of cleanliness and labour-saving at any point throughout the process of preparing, cooking, and serving meals at the rate of thousands an hour.

The Gas Supply.

The story of gas is by no means finished in the kitchens at the Earl's Court Exhibition Building. It is presumed—and rightly—that the exhibitors at such exhibitions as may in the future be held there will want to take advantage of the ready services provided by gas to a greater or less extent in connection with their displays.



Meter House at the Warwick Road End, showing the Two 15,000 Cu.Ft. per Hour Meters and the Pressure Reducing Governors.

The Gas Light and Coke Company have accordingly carcassed the display area, as well as other parts of the building, with a view to meeting such needs. No less than six miles of piping have been laid by the Company through-

out the premises, the principal supplies for the main hall being run in the basement ceiling. An ingenious feature of the construction of the main hall is that advantage has been taken of the supporting stanchions to house the various individual services to exhibition stands. Thus each stanchion carries a flue, water supply, telephone lines, A.C. and D.C. electricity, and, of course, gas. Alternative tappings to the gas service can be taken just above floor level or about 13 ft. up, so that in the latter case exhibitors can take their supply at this higher level to meters on the tops of their stands. Where flues are available 2-in. and 3-in. supply pipes have been run to enable the operation of the largest types of gas apparatus. There are altogether 80 exhibitors' gas services.

It will be readily appreciated that so large a potential demand for gas as exists in this building for all purposes called for rather exceptional treatment on the part of the Gas Light and Coke Company. There are two main entrances to the building—one from Warwick Road and the other from Richmond Road; from the former has been run a 6-in. high-pressure service and from the latter an 8-in. low-pressure service, each of which feeds into a separate meter house. At the Warwick Road end are two 15,000 cu.ft. per hour meters, one for the exhibitors and one for the catering, together with the necessary pressure reducing governors. At the Richmond Road end is a similar sized meter for the exhibitors and a further 9,000 cu.ft. per hour meter for the catering. In addition, there are a number of smaller check meters for various purposes in the kitchens. From the meters 6-in. diameter trunk mains feed the various branch supplies to the exhibition hall, &c.

As there are two separate services it has been necessary to fit back-pressure valves, which make it impossible for gas to pass back through the meters, no "stops" being fitted on the latter in the case of these larger sizes. Moreover, it is possible to switch over from the catering meters to the exhibitors' meters, or *vice versa*, in the event of a breakdown in either, an alternative feed being provided in either case from each of the two main services. Altogether, the Gas Light and Coke Company have carried out a very fine piece of "service" work in connection with this vast installation.

Gas Undertakings' Results

Burnley.

The annual report of the Engineer and Manager of the Burnley Gas Department, Mr. A. F. Ames, for the year ended March 31, 1937, states the total expenditure on revenue account during the year has been £111,655, against £110,037 during 1935-36, and the income has been £146,338, against £148,883 last year. This gives a gross profit of £34,683, against £38,845 the previous year. After deducting interest on loans, sinking fund charges, and income-tax, there remains a net profit of £4,440. The net profit for the previous year was £4,882. The net capital indebtedness at March 31 last was £307,014, being equal to £332 per million cu.ft. of gas sold, against £348 last year. The make of gas during the year has been 481,064,000 cu.ft. of coal gas and 55,000 cu.ft. of carburetted water gas. The Department purchased 542,856,848 cu.ft. of coke oven gas, making a total figure of 1,023,975,848 cu.ft., compared with 1,021,538,663 cu.ft. during the previous year. The gas sent out has been 1,023,335,848 cu.ft., or 5,116,679 therms, against 1,021,757,663 cu.ft., or 5,108,788 therms, during the previous year, equal to an increase of 1,578,185 cu.ft., or 0·15%.

Lincoln.

The City Treasurer's Report upon the Accounts of the Lincoln Gas Department for the year ended March 31, 1937, states the net profit for the year was £12,489, an increase of £10,844 over the previous year. This very satisfactory result was brought about by an increase of £3,497 in the profit from the sale of gas and residual products and a saving of £7,347 in debt charges due to the final repayment of loans on the old works. The number of consumers supplied through prepayment meters continues to increase, the number at March 31, 1937, being 13,342, of whom 1,211 resided outside the City boundary. The cash collected from prepayment meters was £39,910, as compared with £39,377 in the previous year. The net profit of £12,489 has been transferred to the net revenue appropriation account, the balance on this account now standing at £29,534. Mr. G. Wright, Engineer and Manager, reports that the gas production during the year was 724,860,000 cu.ft., an increase over the previous year of 90,144,000 cu.ft., chiefly due to the industrial load. Apart from the industrial load, the Department still continues to make progress, new consumers added being 301, making a total of 19,221. The increase in cookers during the year is 573, making the total number in use at the present time 14,602. The length of mains has been increased by 5 miles 903 yd., making 131 miles 786 yd., and the distance from north to south is now over ten miles. The value of appliances and fittings sold still maintains a very satisfactory figure. The amount for the year was £10,578, making a grand total of £141,090 since 1923, when direct selling of appliances was instituted.

Manchester.

The report of the Manchester Gas Committee for the year ended March 31, 1937, states the quantity of gas sold was 6,303,652,000 cu.ft., a decrease of 1·77% compared with the previous year. For the year, the first complete financial year that the optional two-part tariff has been in operation, 10,606 consumers have been charged on this basis, the consumption affected being 1,529,208,000 cu.ft., representing 24·26% of the total sales for the year. The concession thereby made to the consumers concerned is approximately £55,000 for the year. The quantity of gas consumed for industrial and commercial purposes during the year was 1,718,969,000 cu.ft., or 27·27% of the total sales. Special contracts, including bulk supplies, have now been made with 78 consumers. The total annual supply thus assured is approximately 450 million cu.ft. The income from coke has increased by £16,676 when compared with last year. The demand for graded coke for domestic use continues to be well maintained. The income from tar shows an increase of £8,533. The recovery of benzole and solvent naphtha continues to be satisfactory and the income from this source shows an increase of £704 compared with the previous year. After meeting all outlay under renewals account there is a balance to the credit of the account of £310,698. The amount transferred from revenue account was £91,400, which, together with the interest on the fund amounting to £8,746, gave a total credit for the year of £100,146. The amount expended during the year was £80,994. Additional loan capital has been raised to the extent of £12,500 mainly for distribution apparatus. The total capital outlay at March 31, 1937, was £6,279,520, the loan debt in respect of which was £1,562,183, or 25%. The amount provided out of revenue for the redemption of debt was £113,274, and loan debt has been redeemed during the year by this sum. After transferring £5,834 to the working capital fund account, which will now amount to £100,000, the Gas Committee deem it desirable to carry forward the balance of £89,853 remaining to the credit of the net revenue account.

Nottingham.

The Nottingham Gas Committee report that during the year ended March 31, 1937, the excess of revenue income over working expenses to be carried to net revenue account was £136,136. To this balance has been added £2,811 in respect of bank interest and interest on investments, making a total of £138,947. The expenditure in respect of interest on capital, provision for redemption of loan debt, and income-tax has amounted to £63,990, leaving a net profit for the year of £74,958. To this amount there has been added the balance brought forward from last year of £22,845, making a total of £97,802, and this has been appropriated to the extent of £31,500 contribution in aid of rate, £8,000 to renewals fund, and £35,375 transferred to capital account, leaving a balance of £22,927 to be carried forward to next year. The Engineer and Manager, Mr. G. Dixon, reports that the gas sold amounted to 3,009,036,000 cu.ft., or 2·58% more than last year.

Salford.

The report of the Light, Heat, and Power Committee of the Salford Corporation with reference to the Gas Undertaking states the gross income for the year amounted to £351,390 and the gross expenditure to £267,774, showing a gross profit of £83,616. Against the gross profit, the following charges fall to be met: Loan charges (interest and sinking fund), £49,314; renewals, £8,879; and contributions to general rate fund, £12,090, making a net total charge to be met of £70,283. The net profit is £13,333. This compares with a debit balance of £20,997 for the previous year. The quantity of gas sold during the year shows an increase of 0·34% on the previous year. The Department took over the maintenance of the gas street lighting of the City and commenced the general modernization of the equipment on April 1, 1936. Residual products have provided a revenue equal to 73·07% of the cost of coal used, against 54·3% in the previous year. This is due to an improved coke position, better market prices for tar, and, in addition, there is a new source of revenue to the Department from the sale of crude benzole. Approximately nine months' working of the plant has resulted in a net revenue to the Undertaking of £10,208, or 9·21% of the cost of coal used. The first section of the works reconstruction scheme has been completed during the year. The vertical retort installation at the Regent Road Works, consisting of the reconstruction of the original five settings, together with a further extension of two settings, all of the most modern design, was completed and put to work in October, 1936. At the same time, the new waste-heat boilers, coke conveying, coke screening plant, and coke storage hoppers were completed and put into use.

(*Further Gas Undertakings' Results see p.* 123.)

MANCHESTER DISTRICT ASSOCIATION OF GAS ENGINEERS

Presidential Address

OF

R. N. WEBB

(of the Leeds Corporation Gas Department)

Presented at a Meeting of the Association held at Leeds on Friday, July 2, 1937.

(*Concluded from p. 63.*)

Coke Handling and Grading.

The coke from the retorts is handled by electric telphers, and recently a new method has been introduced for the efficient slaking of the coke. The former method of dealing with it consisted of pushing the coke from two retorts into an ordinary open skip (see fig. 5), partly slaking it by hose-pipes, and finally slaking it by means of sprays at a tank, situated outside the retort house, at yard level. This method was wasteful in water and prolonged the length of the draws; it also had the greater disadvantage of causing the content of moisture in the coke to vary very considerably.

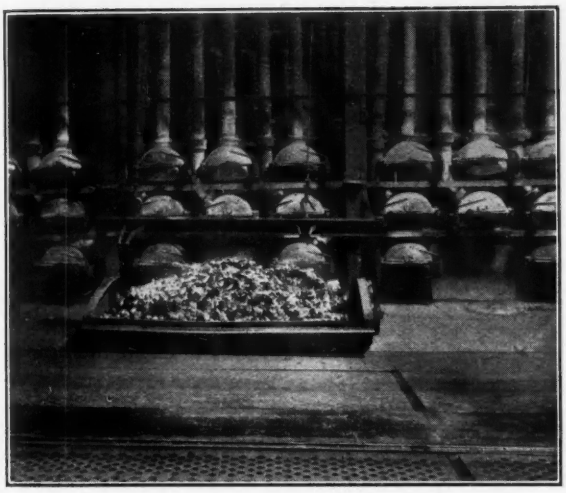


Fig. 5a.—Old Open Skip. Coke partly slaked. Skip ready for hoisting.

The new method necessitates the use of larger skips each provided with a lid (also shown in fig. 5). The skip is lowered on to a cradle, 9 in. high, which permits the lid (built in with the bale) to swing back sufficiently to allow the coke from the top tiers of retorts to fall into the skip. After the skip has received its charge (from two retorts) the lid is rotated into position by the telpher and the skip and unslaked coke hoisted and taken to a tank of water outside the house, in which it is totally submerged (see fig. 6). Rest-bars are built in 3 ft. from the bottom, and by lowering the skip on to these bars, with 36 in. of water above the top of the coke in the skip, and immediately lifting it again the coke is so slaked that the larger pieces are perfectly dry when taken from the grader-bars of the coke plant and the household coke ($\frac{3}{8}$ in. to $1\frac{1}{4}$ in.) only contains 4% to 5% of moisture. Trials for moisture content in coke slaked with varying depths of water were carried out with the following results:

Depth of Water above Top of Coke.	Moisture Content in				
	Large Coke.	$2\frac{1}{2}$ In. to $1\frac{1}{4}$ In.	$1\frac{1}{4}$ In. to $\frac{3}{8}$ In.	$\frac{3}{8}$ In to $\frac{1}{8}$ In.	$\frac{1}{8}$ In. to Dust.
3 feet . . .	Dry	1·5%	4·3%	6·8%	12·0%
5 ,, . . .	0·6%	2·4 ,,	8·0 ,,	12·5 ,,	15·0 ,,
7 ,, . . .	1·0 ,,	3·0 ,,	10·0 ,,	13·3 ,,	17·0 ,,

It will be realized that the length of time the coke is submerged will influence the moisture content, and it was decided to obtain a sufficiency of time by having a certain depth of water through which the coke must pass, down to and up from the rest-bars, rather than rely on a *length* of time of submersion which would have to be left to the discretion of the telpher-drivers.

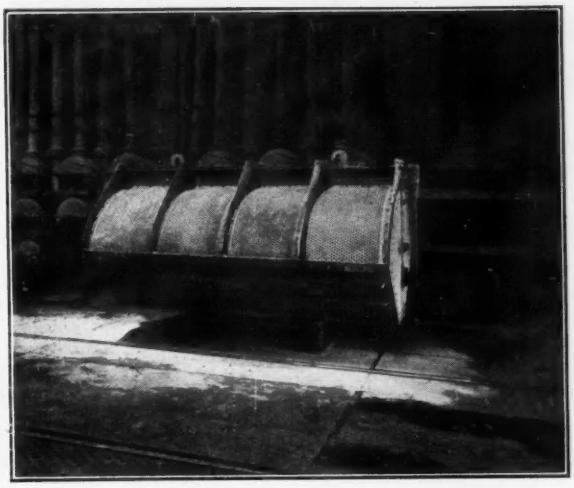


Fig. 5b.—New Skip. Front view. Lid closed.

The advantages of having the proper depth of water, which additionally ensures the correct length of time, will be apparent to all, I think. Each telpher-man has the same definite work; each skip of coke receives the same treatment which ensures the same moisture content in the coke, within narrow limits, skip by skip. Incidentally, the time taken to do each draw has been reduced by ten minutes. The quantity of water used (in the tank) for slaking by the method described is 40 gallons per ton of coke.

From the slaking tank the coke is transferred to the receiving hopper by telpher; from this hopper the coke is fed, by means of a reciprocating tray-feed, either through a coke-cutter or direct on to a belt-conveyor which transfers the coke into lipped gravity-buckets which elevate it to the 25 tons per hour grading plant at the top of the coke-storage bunkers; the coke then passes over oscillating grader-racks, in two decks, and is graded to the following

Fig. 5c.—New Skip. End view. Lid opened to admit coke.

sizes: Breeze, $\frac{3}{8}$ in. to dust; walnuts, $\frac{3}{8}$ in. to $\frac{7}{8}$ in.; household coke, $\frac{7}{8}$ in. to $1\frac{1}{4}$ in.; large broken coke, $1\frac{1}{4}$ in. to $2\frac{1}{2}$ in.; and large coke, all over $2\frac{1}{2}$ in. The first belt conveyor dealt with approximately 130,000 tons of coke before being replaced. Spiral chutes are placed in each bunker,

and these quite definitely prevent the formation of dust in excess.

Railway wagons can be quickly loaded from any of the bunkers, and bagging plants for three different sizes of coke are installed. The introduction of this grading plant, three-and-a-half years ago, has undoubtedly been the means of greatly increasing local sales, the public evidently appreciating the fact of being able to obtain what they

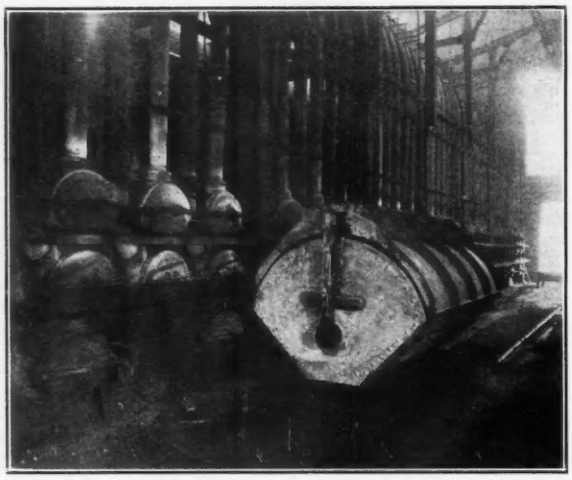


Fig. 5d.—New Skip. End view. Lid closed. Coke not slaked. Skip ready for hoisting.

require. It may be interesting to state here that over 146,000 bags of graded coke have been supplied from New Wortley during the last eighteen months.

Benzole.

The benzole plant at New Wortley was erected by Messrs. Simon-Carves, Ltd., in 1915, and production was commenced in November of that year and continued till 1924.

The plant was then closed down for about three years, but since December, 1926, all the gas produced has been washed for benzole. We are convinced, from this experience, that the cost of benzole to us is only that of the coal required to produce the benzole therms, the extra fuel to the boilers, and a small cost for labour.

The washing medium is, and always has been, creosote oil, and in this practice we are now in a minority so far as gas-works are concerned, as gas oil or spindle oil is more generally adopted. Apart from creosote being a product of a gas-works it has the advantage of having over 50% greater absorptive capacity for benzole than gas or spindle oils and this must result in a reduction in the amount of oil to be circulated for a given benzole extraction, with its consequent saving in steam consumption for pumping, preheating, and steam distillations; also the oil coolers are less likely to be overworked.

A very important item on a benzole plant is the cooling of the wash-oil and the distillates from the stills; this calls for correct proportioning in the condensers and sufficient area on the oil coolers. Our condensers are of the vertical tubular type and originally were all designed for the cooling water to pass through the tubes, the vapours occupying the space surrounding the tubes.

Some years ago the condensers on the rectification side of the plant were altered and the vapours made to pass through the tubes, the water occupying the surrounding space. The reason for making this change was the inefficient cooling of the vapours; it was usual for the water leaving the condensers to be cool, while the distillates were leaving quite hot. The condensers each contain 109 tubes of $1\frac{7}{8}$ in. internal diameter, the total cross-sectional area of the tubes being 300 sq.in., while the area of the vapour pipe feeding the condenser is only 12·6 sq.in.

In attempting to obtain equal distribution of vapours through the tubes it was necessary to reduce the area of the inlet end of each tube so that the combined areas of the 109 tubes were more in agreement with that of the inlet vapour tube. A sheet of lead was perforated with $\frac{3}{8}$ in. diameter holes to coincide with the condenser tubes and was placed over the tubes in the top chamber of the condenser.

This method greatly improved the distribution of the vapours, with the consequent better cooling of the distillates and needing considerably less water; unfortunately, however, lead is electro-positive to iron and the ends of the tubes suffered from accelerated corrosion. A second method was then tried; this consisted of laying steel flats $1\frac{3}{8}$ in. by $\frac{1}{8}$ in. across each row of tubes and holding them in position. Good results were again obtained until corrosion of the steel flats caused us to abandon this method. A third method was tried; on this occasion wood plugs, having $\frac{1}{2}$ in. diameter brass ferrules through them, were driven into the top end of the tubes, and this method has proved very satisfactory in every way.

One objection to the change over is the difficulty of keeping the water side of the tubes clean; we accomplish this by introducing caustic soda into the water space and boiling by the admission of steam.

Some time ago we replaced the old type of preheater to the stripping stills by those of the vertical tubular type; the oil passes through the tubes in an upward direction, the steam being on the outside of the tubes; after working them for some little time we attempted to increase their efficiency by using similar wood plugs with ferrules inserted as mentioned above.

We were immediately successful, the oil flowing more equally through each tube and allowing the necessary temperature conditions to be maintained; the capacity of the heaters has thus been increased. A consequence to the adoption of plugs in the preheater is that the tubes are more quickly and equally coated with deposit and require cleaning more often to maintain the required transmission of heat.

The Chemical Washer.

Turning from the cooling problem, another item of interest to those who rectify their own products is the chemical washer. This is usually a lead-lined vessel capable of holding, in our particular case, about 2,000 gallons of benzole. About two years ago we had arrived at the point of having to decide whether it was more economical to have the washer completely re-lined or carry on with the increasingly frequent patching of the old lead lining; ultimately it was decided to strip the washer completely of its lining and work it without such generally accepted protection. It had been observed that in a comparatively short period after repairing the lining

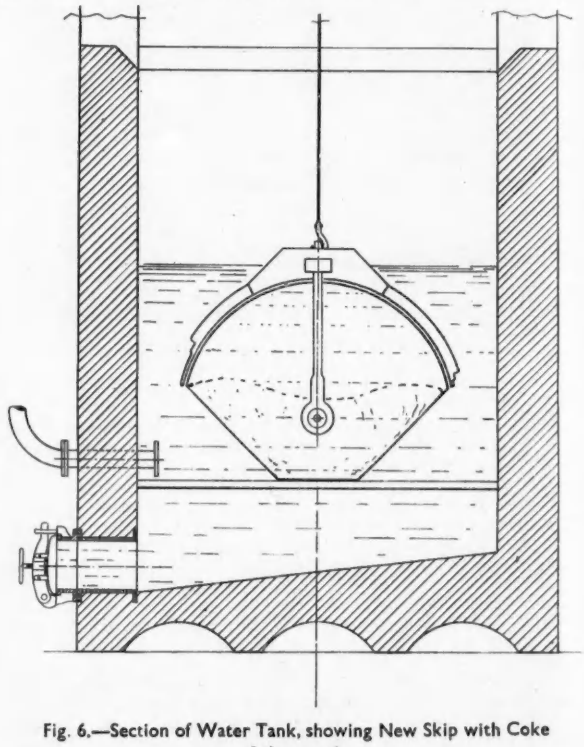


Fig. 6.—Section of Water Tank, showing New Skip with Coke Submerged.

some other defect invariably developed in the lead and allowed the contents of the washer to get behind the lining. It was argued that these conditions tended to accelerate corrosion of the cast-iron body of the washer.

Since the lead lining was removed we have carried out 415 acid washes, and it is very difficult to see that the washer is more affected in any way than it was at the time of the removal of the lining.

There is no doubt that the main corrosion will take

place on the bottom portion of the cone where the acid residues collect when a washing is settling, and we propose to replace our cone, when required, with a cone in two portions, so that the lower part can be removed and quickly replaced when it becomes necessary. We are of the opinion that this will be less expensive than the proper upkeep of a lead lining, even assuming it is possible to have a lining entirely free from leaks.

To explain the freedom from corrosion of the washer in the presence of acids we put forward the following theory—that in the process of filling the washer with benzole prior to the acid washing there is some penetration of the pores of the metal (cast iron) by the benzole which insulates it against the acid in the wash, thereby protecting it from attack.

While on the subject of acid washes I would advise the adoption, where possible, of earthenware cocks in preference to those of the metal type. We have some earthenware cocks of the brick type that have been in use for five years.

Carbon Bisulphide Removal.

With regard to the production of rectified products, the removal of carbon bisulphide from benzole is particularly interesting, and as we have had experience with two well-known processes it might be of interest to say something about them.

The methanol soda process, introduced by the National Benzole Company, was practised by us for two-and-a-half years, and we were obtaining an 80% efficiency in washing based on the caustic soda used, the strength of the soda solution being 4·5 normal. The method was straightforward and simple when familiarity had been acquired, but the serious objection to the process was the difficulty of disposing of the methanol residues. In the absence of a recovery plant, it had to be disposed of either in the gas liquor or on to a rubbish tip; it certainly could not be run into the drains, owing to its strong colour and its still stronger smell.

Disposal by putting it in the ammoniacal liquor was eventually stopped, as it was proved at the ammonia works that several batches of liquid ammonia had been spoiled by the presence of sulphuretted hydrogen in the finished products, which was traced to the presence of methanol residues in the liquor, although it was only present in the proportion of not more than 5 parts per 10,000.

Disposal by carting to a rubbish tip was stopped owing to complaints from the tenants of the property nearby; unfortunately methanol residues give off objectionable odours which increase in offensiveness for some considerable time after dumping.

The methanol-soda process was therefore discontinued and the Yorkshire Tar Distillers polysulphide process adopted. Up to the present this process has given us every satisfaction, and the residues, being returnable to the Company, instead of being a nuisance, actually assist in the reduction of the cost of the extraction of carbon bisulphide. Forerunnings containing approximately 4% to 5% of sulphur as carbon bisulphide are treated with polysulphide in the chemical washer.

One gallon of polysulphide will remove 0·8 to 1 lb. of sulphur as carbon bisulphide, and it is on this basis that the necessary amount of polysulphide to use is calculated.

The plant at New Wortley produced 367,000 gallons of crude benzole during the year ended March, 1937, and this, together with the crude benzole from our Meadow Lane Works, which is also rectified at New Wortley, jointly produced nearly 500,000 gallons of motor benzole. The total amount of refined products produced by the New Wortley plant since its inception is 5,650,000 gallons.

I think it is now generally accepted that the extraction of benzole from coal-gas is a profitable process; this is particularly so at the present time, when coke has such good value. There is another view to take of it also, and that is our country's needs; whether we are called on to make pure benzole or motor spirit there would be need for more than we can supply if it ever became necessary to defend our shores.

Education.

The Education Scheme of the Institution continues to do valuable service for our Industry, and the total number of candidates entering for the examinations keeps remarkably steady. This indicates that many of the younger members of the Industry are fully alive to the necessity of obtaining a firm foundation on which to build their career.

The Education Scheme cannot give them experience; this can only be obtained in the "hard school of life," but such experience becomes more valuable and can be put to better account when backed by a sound training in fundamentals such as are provided by the various courses of the Gas Education Scheme.

It is difficult to know whether or not full advantage is

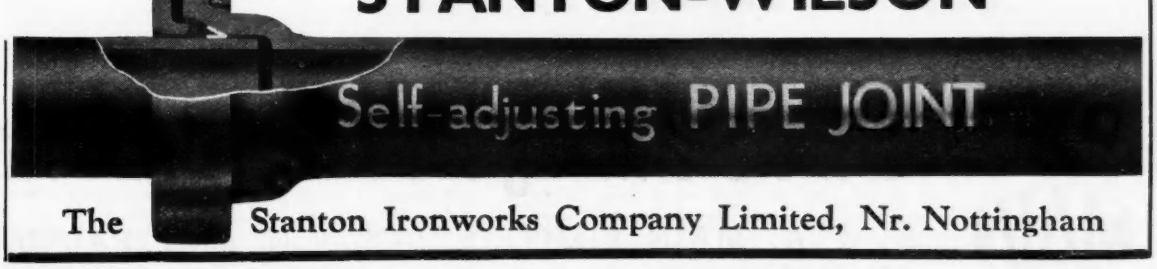
Traffic Vibration
Rigid or Self-adjusting Joints?

Not many of the problems brought into being by the remarkable growth of road transport during the last decade are capable of easy solution.

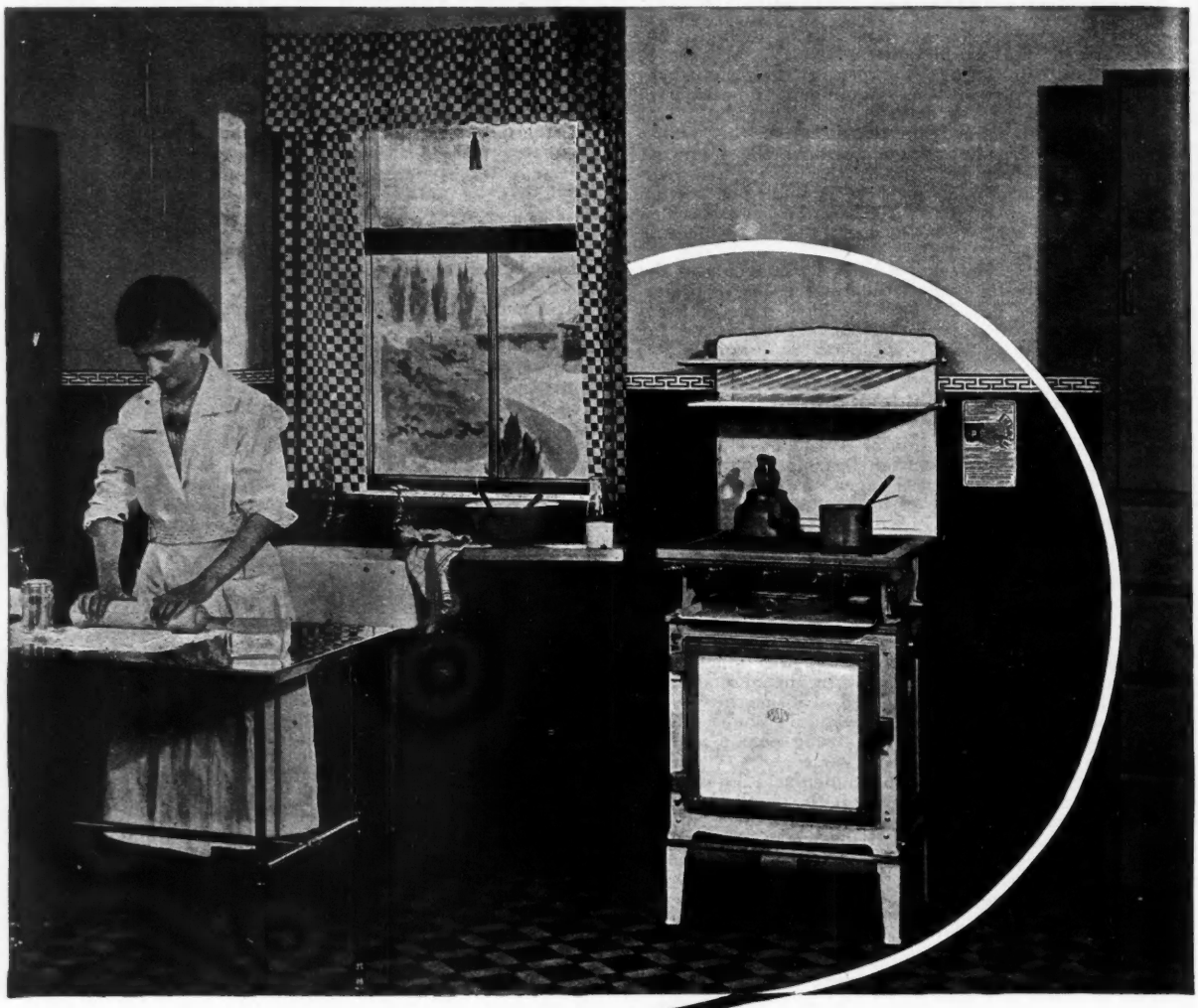
There is at least one exception, however. For instance, though much has been heard of the danger caused to historic buildings by traffic vibration, the harmful effects of such vibration on water and gas mains are not so apparent. To water and gas engineers responsible, however, for the maintenance of these essential public services, this was a very real problem until a few years ago, for rigidly-jointed mains could not be expected to withstand the severe vibration caused by modern conditions.

Some six years ago the Stanton Company introduced the Stanton-Wilson Self-adjusting pipe-joint to overcome this and similar difficulties. That it has successfully done so is proved by the fact that more than 1,500 miles of Stanton-Wilson mains have now been laid by over 750 public authorities.

The STANTON-WILSON



The Stanton Ironworks Company Limited, Nr. Nottingham



An ascending curve

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being taken of the educational facilities offered in the area covered by our Association, but it is hoped that Engineers and others in authority will continue to do everything in their power to encourage the junior members of their staffs in this direction. Students, or intending students, who have any difficulty should be advised to seek the help of either the Lancashire or the Yorkshire District Gas Education Committee.

Those responsible for the administration of the Scheme have deemed it desirable to make a few changes in the Regulations. One such change is that a Second-Class Higher-Grade Certificate in Gas Engineering or Gas Supply is now sufficient for entry to the relevant Diploma Examination.

Although all candidates aspire to first-class certificates, there are some who do not quite reach the standard required, not necessarily in the main subject of Gas Engineering or Gas Supply, but possibly in one of the ancillary subjects taken during the final year of study and maybe one in which they find more than average difficulty; the result is the award of a second-class certificate. To penalize the student again by not allowing him to take the Diploma Examination suggests somewhat harsh treatment, and I welcome this change in the Regulations. Amendments have also been made to the Syllabuses; for example, benzole recovery and dehydration have been added to those in Ordinary and Higher-Grade Gas Engineering. No one will doubt the desirability of including these two important subjects.

While realizing the great difficulties involved in drawing up syllabuses for the various examinations, it is very important that they should be given frequent revision to bring them up to date.

The Examinations for 1937 are now over, and although this is neither the time nor place to review the Papers set, it may not be out of place to mention that my impression of the questions is that they leave little room for complaint.

In the Gas Fitting written Papers a new type of question was given demanding only a few minutes spent with the pen, but much thought—a very interesting innovation. The results of these examinations are awaited by hundreds of candidates, and it is hoped that very few will be disappointed.

In connection with the education of the juniors in our Industry, I should here like to offer the advice to them to join, as soon as they are able, a Junior Gas Association. The whole of the advantages of doing so are not apparent to them at first, and they are perhaps a little shy or diffident in applying for membership. I can assure them there is no need to be so ; the Councils of the Associations will be glad to have them and give them encouragement, and the combination of their studies with the Association Meetings will undoubtedly prove beneficial to them.

In conclusion I desire to express my very sincere thanks to the Chairman, Major Geoffrey Kitson, the Deputy-Chairman, Mr. Alderman Tortington, and the Members of the Gas Committee for their kindness in allowing me to accept office as your President and for granting me facilities for attending the various Association meetings. I should also like to say how grateful I am to my Chief, Mr. C. S. Shapley, for his personal support in everything appertaining to this office.

Vote of Thanks.

Mr. E. Astbury (Liverpool), in proposing that a very hearty vote of thanks be accorded to the President for his Address, remarked that it had been an interesting and descriptive one of the alterations and additions to the plant at the works of which he was in charge. As a carbonizing expert, Mr. Webb had dealt with the methods and apparatus he had adopted to obtain the best results in regard to an increasing make per ton and the maintenance of a uniform calorific value. The results shown in the comparisons of working costs and the table of working costs indicated a steady increase for 1931-1936. A point of great interest was the practical method which had been described of quenching coke and producing a product with a minimum of moisture-content, while he had thrown considerable light upon the question of grading. The fact that there was an increase of sales was a clear indication that the public realized the advantages of the services which were being offered to them. Most gas undertakings had now little or no difficulty in disposing of their stocks of coke and users were not likely to abandon that form of fuel in favour of any other, particularly in times of financial stringency.

Mr. H. Singleton (Huddersfield) seconded the vote. He had enjoyed the friendship of Mr. Webb for the past twenty years and had known him always to be a strenuous worker. An outstanding feature of his activities in connection with the Gas Industry had been his connection with the Yorkshire Junior Gas Association in which organization he still maintained great interest. It was typical of Mr. Webb that he had striven to obtain higher efficiency for horizontal retort working, whereas other Gas Engineers endeavoured to make a good show by putting down new plant and publishing the data obtained by its use. It was now made quite clear that a high efficiency could be maintained with what some people might term to be an old-fashioned plant.

The vote of thanks was carried unanimously by acclamation, and the President, in responding, said that though it had been by no means an easy task to prepare the Address, yet it had been a great pleasure to him to do so. He felt amply rewarded for his efforts by the way in which it had been received.

Mr. C. S. Shapley (Engineer and Manager, Leeds) also paid tribute to the excellent work done by the President in connection with the Leeds Gas Undertaking. His Committee were fully conversant of the extent of his labours, and thoroughly appreciated the excellent quality of its results.

Further Gas Undertakings' Results

Brechin.

The Directors of Brechin Gas Company, in their annual report, recommend a dividend of 2s. 6d. in the £1 on ordinary shares and a bonus of 9d., both less income-tax. After providing for depreciation on preference shares and adding to renewal fund, &c., there remains at credit of profit and loss account, including the amount brought forward from last year, a sum of £2,742. Dividend and bonus will absorb £2,194, leaving a balance of £549 to be carried forward, subject to Directors' remuneration.

Edinburgh.

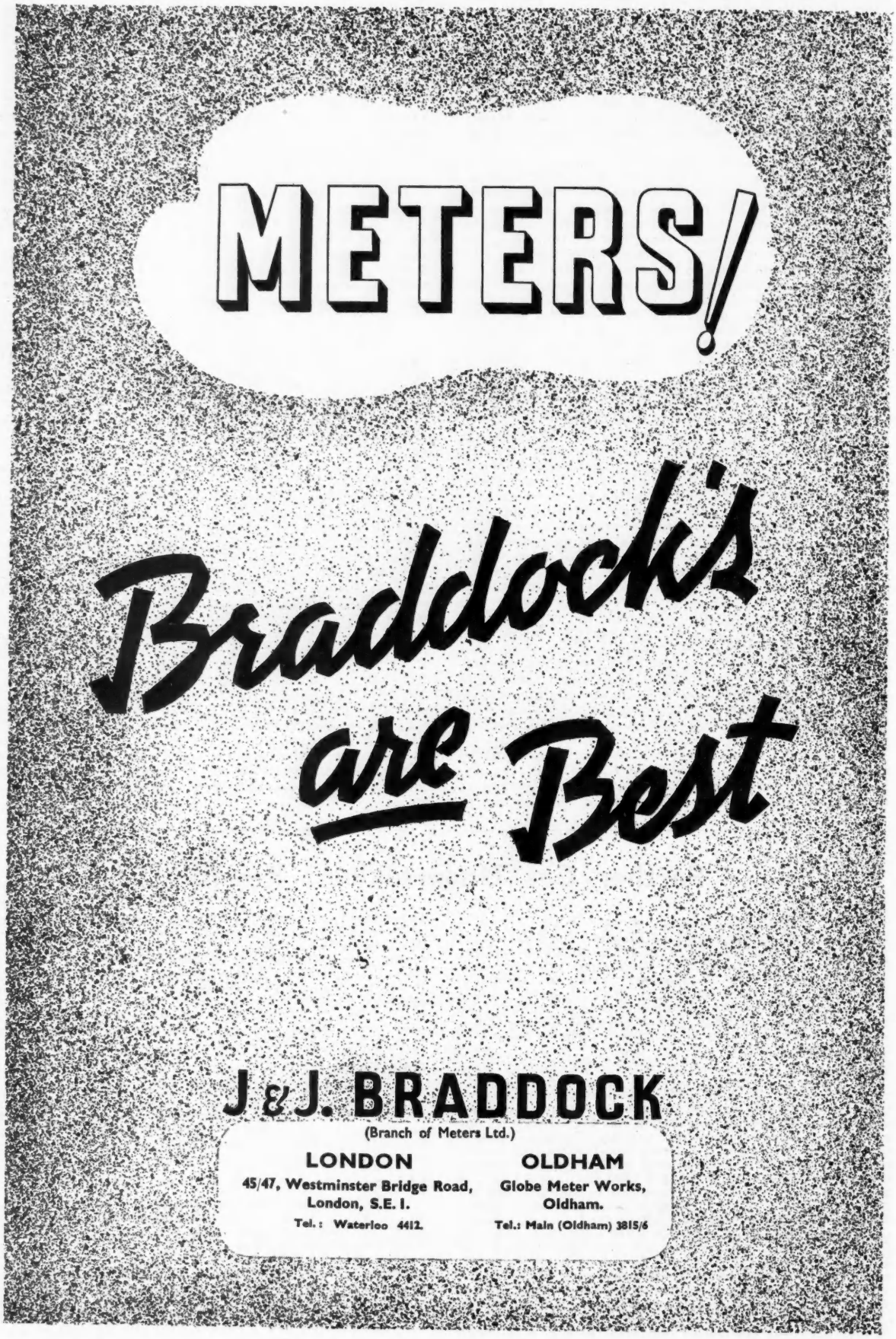
Notwithstanding the substantial reductions made in the price of gas to both ordinary and prepayment consumers the accounts of the Edinburgh Corporation Gas Department for the past year showed a satisfactory surplus. The full effect of reductions in the price of gas during 1935-1936 was not experienced until 1936-1937 and the average price of gas had attained another low record of 2s. 5·31d. per 1,000 cu.ft., or 6·171d. per therm. The total expenditure amounted to £609,309, and the gross revenue to £755,453, making a gross profit of £146,144, while after meeting interest and sinking fund charges amounting to £90,921 and income-tax £25,974, the net surplus amounted to £29,249. During the year the following items of a special character were paid from revenue: New service pipes, £14,500; special contribution towards depreciation of meters and cookers, £10,000; special grant to superannuation fund, £7,000; contribution towards cost of Coronation decorations, £2,500; and grant for modernizing gas street lighting, £2,000, total £36,000. Gas sent out passed the 4,000 million cu.ft. mark for the first time. The actual output was 4,090 million cu.ft. as compared with 3,935 million cu.ft. in 1935-1936, an increase of 155 million cu.ft., or nearly 4%, which follows an increase of 6% in the previous year. Appliance sales have been well maintained throughout the year in spite of the tendency to rising prices of appliances. Appliances fitted on the district during the year included over 10,000 cookers and 3,000 other cooking appliances, 3,300 heating appliances, 700 water heaters, and 90 refrigerators. Notwithstanding the increased costs for coal and other raw materials it is not anticipated that any alteration in the price of gas will be made.

Galashiels.

For the year the Galashiels Gas Light Company has made a profit of £3,047, and a dividend of 6%, free of tax, has been declared. The Company has increased the price of gas by 3d. per 1,000 cu.ft. on account of the increased price of coal, which has risen to £1,336 compared with the same tonnage of two years ago.

Lisburn.

In the annual report of Lisburn Gas Department, Mr. A. S. Brook, Engineer and General Manager, states that the net profit is £1,050 as against £1,498 last year. The sale of gas has increased by 215,900 cu.ft., the prepayment consumers having taken 945,500 more and the ordinary consumers 729,600 less. The extended hire-purchase terms met with further approval, resulting in the sale of 217 cookers and hot water apparatus, an increase of 38 on last year's figures. The number of gas consumers was 1,082 using ordinary meters and 2,373 using prepayment meters, a total of 3,454, compared with last year's total of 3,423.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Trade Notes

"Keith" Industrial Gas Heating Specialities.

The latest list issued by the Blackman Export Company, Ltd., Air and Gas Engineers, 23, Queen Square, Southampton Row, W.C. 1, includes the firm's standardized apparatus only, but they state they also supply gas heating equipment to meet clients' own requirements. These standardized apparatus include injectors and burners, "Keith" automatic mixture and flue damper controls, flat irons, and soldering and brazing tools.

A New Battery for Catalytic Ignition.

For a considerable time the Horstmann Gear Company, Ltd., have been experimenting with dry cell batteries with the object of finding and standardizing a type to give the best service in conjunction with their "Newbridge" electro-catalytic ignition devices.

The most important attributes in a battery are reliability and long life, and in collaboration with Britannia Batteries, Ltd. (makers of the well-known "Pertrix" non-salammoniac dry batteries) a special type has ben evolved known as "X.L. QUALITY," which is particularly suitable for use with electro-catalytic ignition appliances.

The advantages claimed of these batteries are as follows:

(1) They will withstand heavy electrical discharges of short duration without detriment. (This is a particularly valuable feature in batteries used with electro-catalytic ignition devices.)

(2) They have an excellent "shelf life," which means that they may be stored for some months without deterioration.

(3) They are capable of withstanding relatively high temperatures under working conditions.

(4) The actual increased capacity of 15% compared with standard batteries, coupled with their other characteristics, mean that in practice their working life is about 50% greater than the best quality salammoniac cells.

(5) The non-salammoniac chemical composition is such that they possess a high resistance against polarization and corrosion of the terminals.

Both as regards composition and the care exercised during all stages of their manufacture, these batteries represent a considerable technical achievement and they are particularly suitable for use with electro-catalytic ignition devices.

These batteries are manufactured specially for and obtainable only from the Horstmann Gear Company, Ltd.

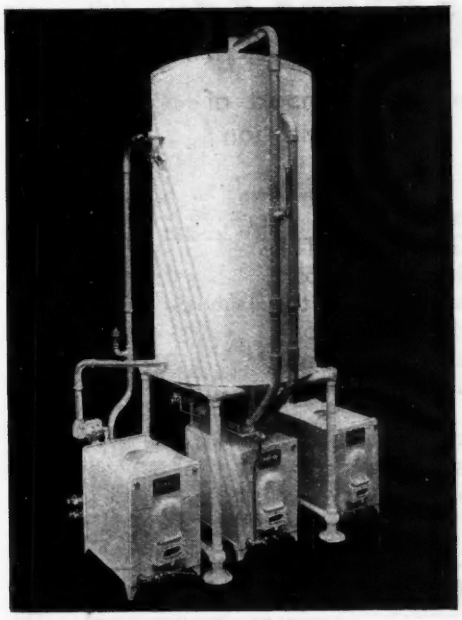
A Return Trap for Hot Feed Water.

The advantages of a supply of hot feed water to a boiler do not require emphasis, but the difficulties of attaining this desirable object frequently result in the adoption of methods which entail serious heat losses and create other disadvantages. Condensate from drainage systems is pure distilled water at boiling point; to discharge this water to waste, or even to conduct it to a storage tank or hot-well, before feeding it again to the boiler represents a loss of heat and therefore unnecessary fuel expenses.

A return trap supplied by Messrs. Hopkinsons, Ltd., of Huddersfield, will return condensate to the boiler from drains at much lower levels than, and at considerable distances from, the boiler, resulting in considerable economy in fuel, at the same time reducing scale formation, with consequent increased boiler efficiency and a reduction of maintenance costs. The trap can be readily adapted to supply ordinary feed water to the boiler by arranging a connection to the inlet of the trap, with a check valve and stop valve in the system, so that the attendant, instead of requiring to start up the pump, has simply to operate the stop valve.

The control valve is entirely automatic and is designed on the slide-valve principle, ensuring trouble-free service over a maximum period; no internal parts require lubrication, and the water is thus kept free from oil or grease contamination. When the system is put into operation, the drain valve from the receiver is opened, allowing any accumulation of cold water to run to waste. The drain valve is closed when hot water and steam enter the receiver, and the condensate is forced up the inlet pipe by steam pressure and enters the trap, which, being open to atmosphere, is the lowest point of pressure throughout the system. The rise of the water in the trap lifts the float which communicates its motion by means of the external lever to a rocking skate, the action of which operates the control valve at the top of the trap. The control valve now admits boiler pressure to the trap, simultaneously closing the latter to atmosphere. The pressure in the trap and the boiler are thus equalized, and the water in the trap flows by gravity into the boiler. Further particulars of this interesting device can be obtained upon application to Messrs. Hopkinsons, Ltd.

Gas-fired Hot Water Apparatus for



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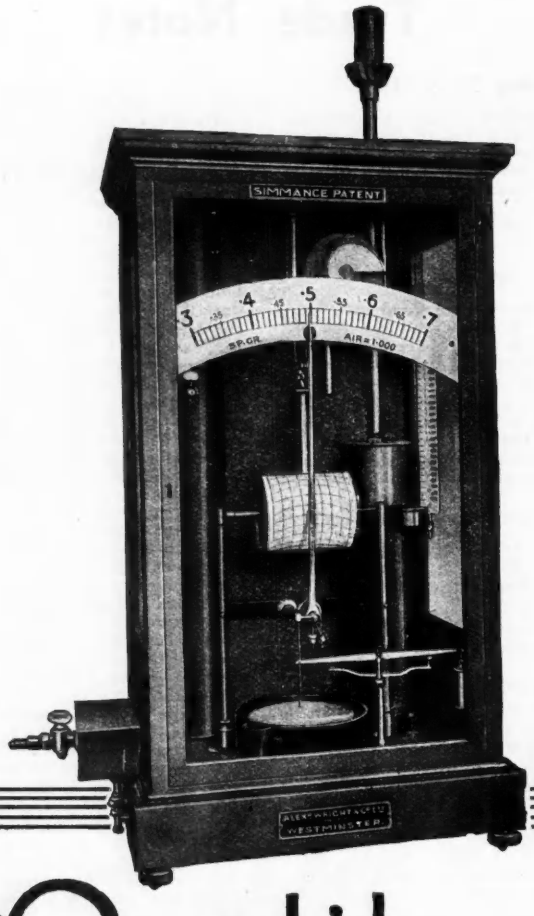

Gas Quality dominates Gas Supply

. . . . that, in our view, epitomises the import of the Papers and Discussions at the recent Institution Meeting.

Much of the information employed was based on data obtained from the Simmance Patent GRAVITOMETERS used at the Undertakings of the Members taking part, and from instruments made by this firm for the measurement of calorific value, carbon-dioxide, carbon-monoxide, A.T.B. number, and other factors affecting the efficiency of gas production and supply.

Our experience in gas-testing and the manufacture of precision apparatus and recorders is always at the service of members of the Gas Industry.

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WESTMINSTER · S · W · 1

Gas Markets and Manufactures

Stock Market Report

(For Stock and Share Lists, see later pages)

Confidence is once more returning to stock markets, and the volume of business last week showed considerable expansion. The recovery was led by the gilt-edged market which was well supported, and prices closed firmer. Home rails also became more active, Great Western ordinary being a good feature. The Prime Minister's speech on Thursday in which he intimated that the trade recovery was only to a small degree attributable to the Government's rearmament expenditure gave a stimulus to the industrial section, particularly iron and steel shares, and many of the favourites made good improvements. Oil and rubber shares also met with more demand, and in the mining market tin shares came into prominence. A certain amount of profit-taking took place at the end of the week, but the firm undertone held in check any marked weakening of prices on this account.

The Gas Market received a steady volume of business and prices on the whole showed little change. The feature in the Official List was a sharp rise of 10 points in Northampton 5% maximum stock to 114½, business ranging from 106½ to 114, which is only a fraction below last year's highest. The Colonial Gas ordinary shares moved up 1s. to 19s., and Imperial Continental began to recover some of the previous weeks' losses, closing 2 points higher at 150½. Prices at the Provincial Exchanges again remained unaltered, while in the Supplementary List the only movement, other than an *ex* div. marking, was a small gain in the nominal quotation of Bognor 7% maximum.

It will be seen that the ordinary and preference shares and debenture stock of the United Kingdom Gas Corporation being now officially quoted have been transferred from the Supplementary List, and to the latter list have been added Associated Utilities (a subsidiary of the Mid-Southern Utility Company) 4% preference shares and 3½% debenture stock, Luton consolidated "A," and the 5½% and 6% preference stocks and 5½% debenture of the Rugby Gas Company.

The Directors of the South-Eastern Gas Corporation announce that their recent offer to the Stockholders of the North Middlesex Gas Company has been accepted by a substantial majority, and Associated Utilities report they have acquired a controlling interest in the Reading Gas Company.

Current Sales of Gas Products

The London Market for Tar Products.

July 12.

There is but little change to report in the prices of Tar Products, which are as follows:

Pitch is 38s. per ton f.o.b.
Creosote, 6d. to 6¼d.
Refined tar, 3¾d.
Pure toluole, 2s. 6d.; pure benzole, 1s. 9d.; 95/160 solvent naphtha, about 1s. 8d.; and 90/160 pyridine, about 8s.; all per gallon naked at makers' works.

Tar Products in the Provinces.

July 12.

The average prices of gas-works products during the week were: Gas-works tar, 23s. 3d. to 28s. 3d. Pitch—East Coast, 36s. to 37s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 35s. to 36s.* Toluole, naked, North, 2s. to 2s. 1d. Coal tar crude naphtha, in bulk, North, 8½d. to 9d. Solvent naphtha, naked, North, 1s. 6½d. to 1s. 6¾d. Heavy naphtha, North, 1s. 3d. to 1s. 3½d. Creosote, *ex* works, in bulk, North, liquid and salty, 5d. to 5½d.; low gravity, 4⅜d. to 4½d. Heavy oils, in bulk, North, 5d. to 5½d. Carbolic acid 60's, 3s. 7½d. to 8s. 10½d. Naphthalene, £18 to £20. Salts, 90s. to 95s., bags included. Anthracene "A" quality, 4½d. to 4¾d. per minimum 40% purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *July* 10.

There is little to report in the way of new business and any contracts which are being arranged are for smallish quantities.

Crude gas-works tar.—The actual value is 37s. to 38s. per ton *ex* works in bulk.

Pitch is very dull and stocks are beginning to accumulate. Prices are about 30s. to 32s. 6d. per ton f.o.b. Glasgow for export, and 30s. per ton *ex* works in bulk for home trade.

Refined tar.—Owing to seasonal demand a good throughput is being maintained and prices are about 3d. to 3¼d. per gallon free on rails for export, and 3½d. to 3¾d. per gallon *ex* works in buyers' packages for home trade.

Creosote oil.—Production is well looked after and available supplies are commanding not less than the following: Specification oil, 5¼d. to 5¾d. per gallon; low gravity, 6d. to 6¼d. per gallon; neutral oil, 5¼d. to 5¾d. per gallon; all *ex* works in bulk.

Cresylic acid.—Although there are a few spot parcels on the market at present this is not greatly affecting prices, which are: Pale, 97/99%, 4s. 5d. to 4s. 7d. per gallon; dark, 97/99%, 4s. 2d. to 4s. 4d. per gallon; and pale, 99/100%, 4s. 10d. to 5s. 1d. per gallon; all *ex* works in buyers' packages.

Crude naphtha.—Available supplies are quoted at 6d. to 6½d. per gallon *ex* works in bulk, according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 4½d. to 1s. 5½d. per gallon, and 90/190 heavy naphtha is 11d. to 1s. per gallon.

Motor benzole is valued at about 1s. 4½d. to 1s. 5d. per gallon.

Pyridine.—Prices are nominal at 7s. to 8s. per gallon for 90/160 grade and 8s. to 9s. per gallon for 90/140 grade.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole	0 10	to	0 10½	per gallon at works
Motor "	1 3¾	"	1 4	" " "
90% "	1 4½	"	1 5	" " "
Pure "	1 8½	"	1 9	" " "

Contracts Advertised To-Day

Clock Controllers.
Spenborough Street Lighting Department. [p. 133.]

Coal.
Ilkley Gas Department. [p. 134.]

Coal and Coke Handling Plant.
Blackpool Gas Department. [p. 134.]

Coke Screens and Storage Hoppers.
Blackpool Gas Department. [p. 134.]

Gasholder.
Birkenhead Gas Department. [p. 134.]

Painting.
Barrow-in-Furness Gas Department. [p. 134.]

Steam Raising Plant.
Blackpool Gas Department. [p. 134.]

Steel Lamp Columns, &c.
Leeds Gas Department. [p. 134.]

Vertical Retorts.
Blackpool Gas Department. [p. 134.]

400 plants in 24 countries

This installation, built for the Municipality of Svendborg, Denmark, is an interesting example of the modern Glover-West vertical retort plant designed for the smaller works. It is an eight-retort unit with fuel-gas producers equipped for breeze-burning, waste-heat recovery plant and electric lift. Coaling is by means of an automatic skip-hoist.

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STOCK AND SHARE LIST

Official Quotations on the London Stock Exchange

Issue. £	Stock or Share	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations July 9.	Rise or Fall on Week.	Transactions, Lowest and Highest Prices During the Week.
1,767,439	Stk.	Mar. 15	8	8	Alliance & Dublin Ord. ...	170—175	...	...
374,000	,,	June 21	4	4	Do. 4 p.c. Deb. ...	95—100	...	...
558,890	,,	Feb. 15	7	7	Barnet Ord. 7 p.c.	160—165	...	...
300,000	1	Apl. 5	1/4⅔	1/9⅔	Bombay, Ltd.	25/6—27/6	...	...
179,915	Stk.	Mar. 1	9½	9½	Bournemouth sliding scale ...	195—205	...	...
590,407	,,	,,	7	7	Do. 7 p.c. max. ...	161—166	...	164
493,960	,,	,,	6	6	Do. 6 p.c. Pref. ...	133—138	...	...
50,000	,,	June 21	3	3	Do. 3 p.c. Deb. ...	79—84	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	98—103	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	116—121	...	120
357,900	,,	Feb. 15	7½	7½	Brighton, &c., 6 p.c. Con. ...	155—160	...	155½
649,955	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	138—143	...	141
205,500	,,	,,	6	6	Do. 6 p.c. 'B' Pref.	130—135	...	133
855,000	,,	Mar. 1	7	8	British Ord.	148—153	...	...
100,000	,,	June 21	7	7	Do. 7 p.c. Pref.	140—145	...	143
350,000	,,	,,	5½	5½	Do. 5½ p.c. 'B' Cum. Pref.	108—113	...	...
120,000	,,	June	4	4	Do. 4 p.c. Red. Deb. ...	95—100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	102—107	...	...
450,000	,,	,,	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	...
100,000	10	22 May '33	6	4	Cape Town, Ltd.	1⅜—2⅛	−⅛	...
100,000	10	6 Nov.'33	4½	4½	Do. 4½ p.c. Pref. ...	1⅜—3⅛	...	...
150,000	Stk.	June 21	4½	4½	Do. 4½ p.c. Deb. ...	78—83	...	...
626,860	,,	Feb. 1	6	6	Cardiff Con. Ord.	120—125	...	...
237,860	,,	June 7	5	5	Do. 5 p.c. Red. Deb.	107—112	...	...
98,936	1	Apl. 5	2/-	2/-	Colombo Ord.	1⅜—1⅞	...	...
24,510	1	,,	1/4⅓	1/4⅓	Do. 7 p.c. Pref. ...	23/—25/-	...	...
739,453	1	Mar. 15	-/11·48	-/11·48	Colonial Gas Assn. Ltd. Ord.	18/—20/-	+ 1/-	18/—19/1½
296,144	1	,,	1/3·30	1/3·30	Do. 8 p.c. Pref.	22/—24/-	...	23/4½
1,775,005	Stk.	Feb. 1	5	5	Commercial Ord.	88—93	...	92½—93
620,000	,,	June 7	3	3	Do. 3 p.c. Deb. ...	74—79	...	76—77½
286,344	,,	Feb. 15	5	5	Do. 5 p.c. Deb. ...	115—120	...	117—118
807,560	,,	Feb. 15	7	7	Croydon sliding scale ...	143—148	...	...
644,590	,,	,,	5	5	Do. max. div.	109—114	...	111½—113
620,385	,,	June 21	5	5	Do. 5 p.c. Deb.... ...	113—118	...	...
239,000	,,	Feb. 1	5	5	East Hull Ord. 5 p.c....	100—105	...	...
185,355	,,	Feb. 15	6	6	East Surrey Ord. 5.p.c. ...	122—127	...	...
176,211	,,	June 7	5	5	Do. 5 p.c. Deb. ...	113—118	...	...
250,000	1	July 5	4	7	Gas Consolidation Ord. ...	20/—22/-*	...	...
250,000	1	May 24	4	4	Do. 4 p.c. Red Cum. Pref.	19/—21/-	...	19/3—19/9
19,255,284	Stk.	Feb. 1	5⅔	5⅔	Gas Light & Coke 4 p.c. Ord.	24/9—25/9a	...	25/—25/4½
2,600,000	,,	,,	3⅔	3⅔	Do. 3⅔ p.c. max.	82—85	+1	83—85
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	100—103	...	101—102½
2,993,000	,,	July 5	...	3⅔	Do 3⅔ p.c. Red. Pref.	100—103*	...	101—102⅔
8,602,497	,,	May 24	3	3	Do. 3 p.c. Con. Deb. ...	80—83	...	81½—82½
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	110—113	...	...
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb....	109—112	...	110—111
700,000	,,	Mar. 1	25/58	3½	Do. 3½ p.c. Red. Deb....	96—101	...	...
270,466	,,	Feb. 15	6	6	Harrogate New Cons. ...	122—127	...	...
213,200	,,	Feb. 15	6	6	Hornsey Con. 3½ p.c. ...	120—125	...	...
5,600,000	,,	May 24	8	12	Imperial Continental Cap. ...	148—153	+2	146—153
223,130	,,	Feb. 1	3½	3½	Do. 3½ p.c. Red. Deb. ...	90—95	...	...
285,242	,,	Mar. 1	8½	8½	Lea Bridge 5 p.c. Ord. ...	160—165	...	...
75,000	,,	May 24	†10	†10	Malta & Mediterranean ...	150—160	...	...
					Metropolican (of Melbourne)			
392,000	—	Apl. 1	5½	5½	5½ p.c. Red. Deb.	98—103	...	...
231,978	Stk.	Feb. 15	5	5	M.S. Utility 'C' Cons. ...	102—107	...	...
968,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95—100	...	98—99
360,075	,,	June 21	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
148,955	,,	,,	5		Do. 5 p.c. Deb. ...	115—120	...	...
125,000	—	July 1	3⅓	3⅓	Do. 3⅓ p.c. Rd.Rg.Bds.	96—99*	...	...
675,000	Stk.	May 3	†6	†9	Montevideo, Ltd.	86—91	...	89½—90½
250, 00	,,	Feb. 15	7½	7½	North Middlesex 6 p.c. Con.	160—170	...	...
396,160	,,	Feb. 1	5	5	Northampton 5 p.c. max. ...	112—117	+10	106½—114
300,000	,,	Apl. 19	†9	†7	Oriental, Ltd....	162—167	...	...
468,537	,,	June 7	8	8	Plymouth & Stonehouse 5 p.c.	160—170	...	164½
621,667	,,	Feb. 15	8½	8½	Portsmouth & Gosport Cons.	167—172	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	105—110	...	105—107½
73,350	,,	,,	...	5	Do. 5 p.c. Pref. ...	112—117	...	...
441,275	1	May 3	1/-	1/1⅓	Severn Val. Gas Cor. Ld. Ord.	21/—23/-	...	...
460,810	1	Mar. 15	-/10⅓	-/10⅓	,, ,, 4½ p.c. Cum. Pref.	20/—22/-	...	...
133,201	Stk.	Feb. 15	5	8⅓	Shrewsbury 5 p.c. Ord. ...	140—145	...	...
1,371,752	1	May 3	1/2⅔	1/2⅔	South East'n Gas. Cn.Ld. Ord.	24/—26/-	...	24/10½—25/9
871,636	1	Mar. 1	-/10⅔	-/10⅔	Do. 4½ p.c. Red. Cum. Pref.	20/—22/-	...	21/6
498,818	1	,,	4	4	Do. 4 p.c. Cum. Pref. ...	18/6—20/6	−/6	18/9—19/9
450,000	Stk.	Feb. 15	4	4	Do. 4 p.c. Deb.	100—102	...	...
150,000	,,	,,	3⅓	3⅓	Do. 3⅓ p.c. Red. Deb. ...	99—101	...	...
6,709,895	,,	Feb. 1	5	6	South Met. Ord.	107—110	...	108½—109½
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf. ...	132—137	...	132
850,000	,,	,,	4	4	Do. 4 p.c. Irred. Pf. ...	98—101	...	99½—100
1,895,445	,,	June 21	3	3	Do. 3 p.c. Deb. ...	75—80	...	77—77½
1,000,000	,,	July 5	5	5	Do. 5 p.c. Red. Deb....	106—111*	−1	110
1,543,795	,,	Feb. 1	6	6	South Suburban Ord. 5 p.c....	122—127	...	...
512,825	,,	,,	5	5	Do. 5 p.c. Pref....	112—117	...	115
500,000	,,	,,	4	4	Do. 4 p.c. Pref....	95—100	...	...
888,587	,,	June 7	5	5	Do. 5 p.c. Deb....	115—120	...	120
250,000	,,	,,	4	4	Do. 4 p.c. Deb....	97—102	...	...
200,000	,,	...	...	...	Do. 3½ p.c. Red. Deb.	95—100	+ 1½	...
427,859	1	May 3	9⅔	1/2⅔	S. Western Gas & Water Ord.	19/—21/-	...	...
160,523	1	Apl. 19	-/10⅔	-/10⅔	Do. 4½ p.c. Red. Cum. Pf.	20/—22/-	...	...
110,000	Stk.	June 21	4	4	Do. 4 p.c. Red. Deb. ...	97—102	...	...
750,541	,,	Feb. 1	5	5⅓	Southampton Ord. 5 p.c. ...	111—116	...	...
148,836	,,	June 7	4	4	Do. 4 p.c. Deb.	97—102	...	...
350,000	,,	Feb. 15	5⅓	5⅓	Swansea 5½ p.c. Red. Pref. ...	110—115	...	...
94,000	,,	June 7	3⅓	3⅓	Do. 3½ p.c. Red. Deb. ...	95—100	...	98
1,076,490	,,	Feb. 15	6⅔	6⅔	Tottenham and District Ord.	137—142	...	141¾
409,835	,,	,,	5⅓	5⅓	Do. 5½ p.c. Pref....	123—128	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
371,850	,,	June 7	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
750,000	1	Apl. 5	4	6	U. Kingdom Gas Cor. Ord.	20/6—22/6	...	...
936,338	1	May 3	4½	4½	Do. 4½ p.c. 1st Cum. Pref.	20/—22/-	...	21/3
740,933	1	June 7	4½	4½	Do. 4½ p.c.2nd Non-Cum.Pf	17/—19/-	...	...
700,000	Stk.	Mar. 15	3⅓	3⅓	Do. 3½ p.c. Red. Deb. ...	96—99	...	97⅔
373,939	,,	Feb. 15	7	7	Uxbridge, &c., 5 p.c. ...	150—155	...	...
133,010	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
1,371,138	,,	Feb. 1	7	7	Wandsworth Consolidated ...	143—148	...	144—146
1,620,615	,,	,,	5	5	Do. 5 p.c. Pref ...	113—118	...	114—114½
500,000	,,	,,	33/4	4	Do. 4 p.c. Pref. ...	97—100	...	98½—99
1,343,964	,,	June 7	5	5	Do. 5 p.c. Deb. ...	115—120	...	116
383,745	,,	,,	4	4	Do. 4 p.c. Deb. ...	97—102	...	...
558,342	,,	Feb. 1	7	7	Watford and St. Albans Ord.	142—147	...	145
200,000	,,	,,	5	5	Do. 5 p.c. Pref. ...	110—115	...	...
200,000	,,	,,	5⅓	5⅓	Do. 5½ p.c. Pref. ...	123—128	...	...
200,000	,,	June 7	4	4	Do. 4 p.c. Red. Deb.	97—102	...	...
100,000	,,	,,	3⅓	3⅓	Do. 3½ p.c. Red.Deb.	95—100	...	...

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BRISTOL EXCHANGE.								
347,756	Stk.	Feb. 1	5	6	Bath Cons.	121—123	...	...
1,667,250	,,	Feb. 15	5	5	Bristol, 5 p.c. max.	116—117	...	...
120,420	,,	June 7	4	4	Do. 1st 4 p.c. Deb. ...	100½—102½	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100½—102½	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120—123	...	...
274,000	,,	Mar. 1	5	5	Newport (Mon.) 5 p.c.max. ...	103—108	...	...
13,200	12	Mar. 15	7	8	Pontyp'l Gas & W. 10 p.c. 'A'	13½—14½	...	...
13,600	10	,,	5	6	Do. 7 p.c. 'B'	12—12½	...	...
40,000	10	,,	5	6	Do. 7 p.c. 'C'	12—12½	...	..
140,778	Stk.	Feb. 1	5	5	Weston-super-Mare Cons. ...	112—113	...	..
64,338	,,	June 21	4	4	Do. 4 p.c. Deb.	96—98	...	...
33,340	,,	,,	7½	7½	Do. 7½ p.c. Deb.	157—160	...	..
LIVERPOOL EXCHANGE.								
157,150	Stk.	Feb. 1	5	6½	Chester 5 p.c. Ord.	106—111	...	...
92,500	,,	June 21	4	4	Do. 4 p.c. Pref.	97—101	...	...
36,430	,,	,,	3	3½	Do. 3½ p.c. Deb.... ...	89—94	..	...
41,890	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	98—102	...	...
2,167,410	,,	Feb. 15	6	6	Liverpool 5 p.c. Ord. ...	125½—127½	...	...
245,500	,,	June 21	5	5	Do. 5 p.c. Red. Pref. ...	99—104	...	...
306,083	,,	July 1	4	4	Do. 4 p.c. Deb. ...	102—104	..	..
106,280	,,	Feb. 1	10	10	Preston 'A' 10 p.c.	210—220	..	..
188,219	,,	,,	7	7	Do. 'B' 7 p.c.	150—160	..	..
NEWCASTLE EXCHANGE.								
122,577	Stk.	Feb. 1	8	8	Blyth 5 p.c. Ord.	166—168	...	...
732,000	,,	Feb. 15	5	5	Hartlepool G. & W. Cn. & New	124—126	...	...
2,061,315	,,	Feb. 1	5	5¾	Newcastle & Gateshead Con.	25 3—25 9a	...	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	100—101	...	...
776,706	,	June 21	3½	3½	Do. 3½ p.c. Deb. ...	91—92	...	...
277,285	,	Nov. 2	5	5	Do. 5 p.c. Deb. '43...	108—109	..	..
332,351	,	Feb. 1	6	6	Sunderland 6 p.c. max. ...	139—141	..	..
NOTTINGHAM EXCHANGE.								
542,270	Stk.	Mar. 1	7	9	Derby Con.	155—165	...	...
55,000	,,	June 7	4	4	Do. 4 p.c. Deb.	100—105	...	..
84,750	,,	Feb. 17	5	12	Long Eaton 'A' Ord. ...	...	...	..
50,000	,,	,,	4	10	Do. 'B' Ord. ...	...	...	..
20,000	10	June 21	5	5	Do. 5 p.c. Pref. ...	10—12	...	..
£0,000	Stk.	,,	5	5	Do. 5 p.c. Deb. ...	105—110	...	..
SHEFFIELD EXCHANGE.								
10,000	Stk.	Aug. 10	10	10	Great Grimsby 'A' Ord. ...	210—220	...	...
6,500	,,	,,	10	10	Do. 'B' Ord. ...	210—220	...	...
79,000	,,	,,	10	10	Do. 'C' Ord. ...	205—210	...	...
1,806,339	,,	Feb. 15	6	6½	Sheffield Cons.	144—146	...	...
95,000	,,	July 5	4	4	Do. 4 p.c. Deb.	100—103*	—1	...

Supplementary List of Stocks and Shares not Officially Quoted

202,152	Stk.	Mar. 15	25/-b	25/-b	Ascot Ord.	102—107	...	...
128,182	,,	July 5	5	5	Do. 5 p.c. Pref. ...	108—113*	—2	...
474,410	1	May 24	5	5	Assd. Gas and Water Ord. ...	19/6—21/6	...	20/—20/9
500,000	1	,,	4½	4½	Do. 4½ p.c. Cum. Pref. ...	19/6—21/6	...	20/6—20/7½
500,000	Stk.	Mar. 15	3½	3½	Do. 3½ p.c. Red. Deb. ...	95—100	...	97⅞
31,035	1	...	...	...	Associated Utilities 4 p.c. Pref.	17/—19/-	...	...
100,000	Stk.	...	...	...	Do. 3½ p.c. Red. Deb.	95—100	...	...
17,000	,,	Feb. 15	8	8	Bognor Orig. Ord. 'A' ...	160—170	...	...
62,210	,,	,,	8	8	Do. New Addl. 'A' ...	160—170	...	...
87,160	,,	,,	7	7	Do. New 7 p.c. max. ...	141—146	+1	141
37,440	,,	Feb. 1	10	10	Cam. Univ. & Town 10 p.c.max.	195—205	...	...
125,970	,,	,,	7	7	Do. 7 p.c. max.	137—142	...	...
39,025	,,	,,	5	5	Do. 5 p.c. max.	98—103	...	...
65,000	,,	Mar. 1	7½	8½	Eastbourne 'A' 5 p.c. ...	160—165	...	160
198,000	,,	,,	6	7	Do. 'B' 3½ p.c.	130—140	...	...
112,312	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
130,000	,,	June 21	5	5	Do. 5 p.c. Deb.	115—120*	...	...
24,000	30	Feb. 1	8½	8½	Great Yarmouth 8½ p.c. max.	45—50	...	...
59,400	30	,,	7⅞	7⅞	Do. 7⅞ p.c. max.	40—45	...	...
51,160	Stk.	June 7	5½	5½	Do. 5½ p.c. Deb.	120—125	...	...
152,600	,,	Feb. 15	8	9	Guildford Cons.	190—200	...	...
54,055	,,	,,	5	5	Do. 5 p.c. Pref.	112—117	...	...
68,250	,,	June 7	5	5	Do. 5 p.c. Deb.	113—118	...	...
156,600	,,	Feb. 15	7½	7½	Hampton Court Cons. ...	163—168	...	...
73,620	,,	Mar. 15	8¾	8¾	Luton Cons. 'A'	166—171	...	...
107,960	10	Mar. 15	4	5½	Mid Kent Ord.	9—10	...	...
230,940	Stk.	Feb. 15	10	10	Oxford & District Ord. ...	207—212	...	209½—210½
47,112	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	110—114½
50,000	,,	,,	6	6	Do. 6 p.c. Red. Pref. ...	112—117	...	...
126,193	,,	May 3	7½	7½	Peterborough Ord.	159—169	...	...
64,990	,,	Mar. 15	6½	7½	Redditch Ord.	127—137	...	...
166,850	,,	Feb. 15	8	8	Romford Ord.	157—167	...	...
60,000	,,	,,	4	4	Do. 4 p.c. Pref.	97—100	...	...
44,000	,,	Mar. 15	5	5	Do. 5 p.c. Deb.	115—120	...	...
25,570	,,	Feb. 15	5½	5½	Rugby 5½ p.c. Pref.	125—130	...	...
25,000	,	,,	6	6	Do. 6 p.c. Red. Pref. ...	106—111	...	...
42,750	,,	June 7	5½	5½	Do. 5½ p.c. Deb.	122—127	...	...
10,950	,,	Mar. 1	8	8	Ryde Ord.	160—165	...	...
136,191	,,	Feb. 15	5	7	Scarborough Ord.	123—133	...	...
27,825	,,	Feb. 1	8	8	Shanklin & Ventnor Cons. ...	158—168	...	...
270,086	,,	Mar. 15	7	7	Slough Ord.	137—142	...	...
21,000	,,	June 21	5	5	Do. 5 p.c. Deb.... ...	112—117*	...	...
28,872	1	May 24	5½	5½	S. Midland Gas Cpn. Ltd. Ord.	19/—21/-	...	...
28,866	1	Mar. 15	4½	4½	Do. 4½ p.c. Red. Cum. Pref.	18/6—20/6	...	...
137,730	Stk.	Feb. 15	7	7	Southgate & Dist. 7 p.c. max.	140—145	...	...
62,500	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
117,228	,,	Feb. 15	6	5	Swindon Cons.	108—113	...	...
60,425	,,	June 7	5	5	Do. 5 p.c. Deb.	110—115	...	...
64,380	,,	June 7	5	5	Torquay and Paignton 5 p.c. Pf	113—118	...	...
130,000	,,	Feb. 15	5	8	Wakefield Ord.	126—131	...	...
81,650	,,	,,	5	5	Do. 5 p.c. max.	103—108	...	...
82,000	,,	Feb. 1	6	6	Weymouth Ord.	103—108	...	...
98,384	,,	Feb. 1	6	6	Wolverhampton 6 p.c. Pref....	125—130	...	...
160,000	,,	June 21	5½	5½	Do. 5½ p.c. Rd. Db	108—113*	...	...
370,000	,,	Feb. 15	4	6	York Cons.	105—110	...	...
90,000	,,	June 21	5	5	Do. 5 p.c. Red. Deb. ...	105—110*	...	...
133,640	,,	Mar. 1	6½	6½	Yorktown (Cam.) 5 p.c Cons.	130—135	...	...
120,000	,,	,,	5	5	Do. 5 p.c. Pref.	110—115	...	...
35,000	,,	June 7	5½	5½	Do. 5½ p.c. Deb.	123—128	...	...

a The quotation is per £1 of Stock. b Actual for Quarter. * Ex div.

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in

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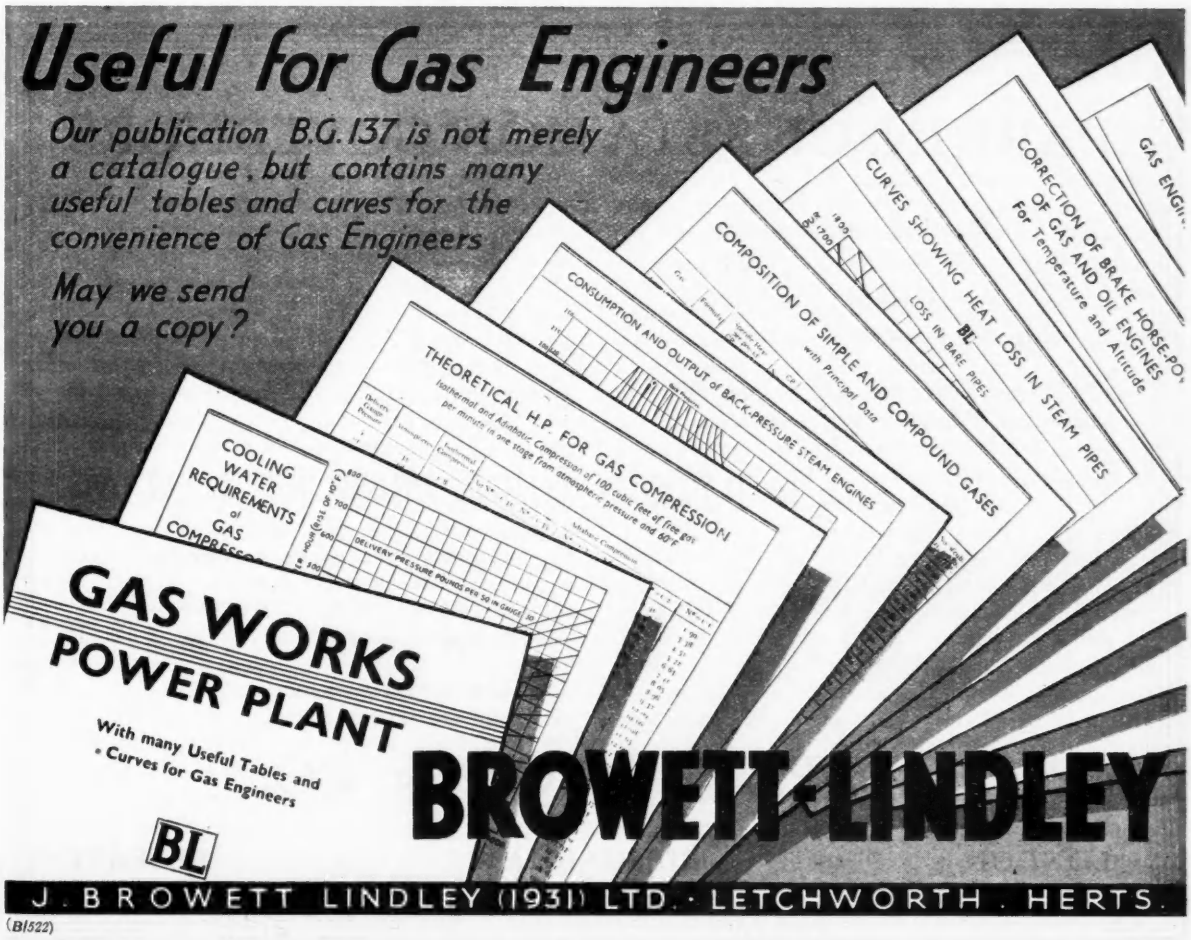
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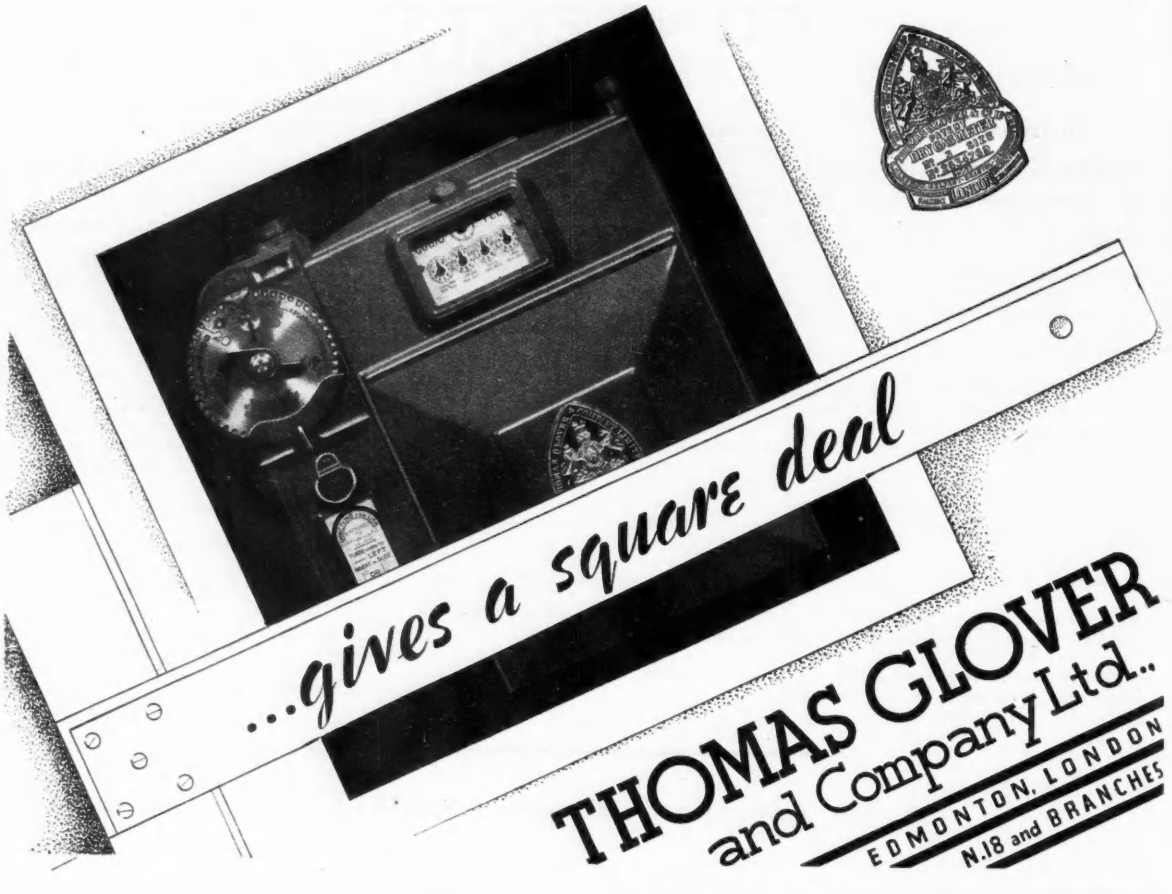

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